THE IRON AGE

New York, April 28, 1921

ESTABLISHED 1855 VOL. 107: No. 17

Some Defects in Foundry Pig Irons

Off Grade Irons Not Always Detected—Excessive Driving of the Furnace—Concrete Example of Bad Effect of Iron Oxide

BY Y. A. DYER

CHEMICALLY stated, pig iron (analysis) is expressed in terms of 100 units of metallic iron and metalloids. Metallic iron is the product obtained by the reduction of iron ores or oxides. Its quality depends on the character of ore used, fuel for its reduction and smelting, limestone for fluxing, furnace practice and general furnace working conditions. Physically stated, pig iron is a composite aggregate of small crystalline metallic and non-metallic grains cemented together with thin films of amorphous (non-crystalline) material composed of iron and other elements. The amorphous material is stronger and tougher than the crystalline, therefore the larger the grains the larger will be the parting or cleavage planes in the metal.

Off Grade or Bad Irons

An apt definition of dirt is "matter misplaced," or misused. An equally apt metallurgical definition of "bad iron" is "iron misused." The author has persistently maintained that where cupola operations and accessory conditions are correct and the character of the iron is known through chemical knowledge and experience, there should be no such characterization as "bad iron"—though the expression is used with emphasis by seemingly well versed foundrymen. An intelligent study of foundry formulas and mixtures for specific castings should readily suggest the best suited pig iron and scrap for such work. Hence, should "bad irons" be knowingly used, then the fault should be chargeable to the mixer, not the mixture.

Volumes have been written on the subject of bad castings and remedies therefor, but it seldom occurs to many foundrymen (further than the conclusion that the "iron is bad") that possibly the basic trouble may sometimes be due to an off grade pig iron which is being used—an oxidized and leanly carburized iron. For this reason it may be of more than passing interest to the foundryman to have some knowledge of the detrimental factors that are of common occurrence in the production of foundry pig iron in the blast furance; first, to gain an insight into the irregularities of furnace conditions which produce an off grade pig iron; second, as information which may assist in the location and correction of troubles which are likely to occur in foundry mixtures by the use of such pig iron produced under adverse furnace working conditions, and which seem difficult to locate after cupola practice and foundry conditions shall have been checked up and found to be correct.

These physical and chemical defects which sometimes exist in foundry irons do not appear to the foundryman in a casual reference to the routine chemical analysis and fracture tests—that is, by reference to determinations of carbon, silicon, sulphur, phosphorus, manganese and noted fractural structure of the metal. These less apparent ills referred to as sometimes existing in pig irons are chargeable to irregular blast furnace operations and control, and when they are not taken account of at the furnace by relegating such irons to the off grade piles are handed down to the foundryman; and in turn their deleterious effects are reflected all down the line of foundry operation.

Oxidized Pig Irons

Irons which contain these very undesirable defects are referred to, unknowingly by many foundrymen, as simply "bad iron." Technically they are chiefly "oxidized" and "leanly carburized" irons, due to furnace irregularities in the form of scaffolds and slips, too heavy burden, excessive limestone, or undue driving of the furnace by reason of desire on the part of operator to force production, or to certain ill designed or faulty lines and construction. Scaffolds in the furnace cause serious trouble and detriment to the grade of subsequently tapped pig iron. When they finally slip a large quantity of iron oxide (the ore not having had time to complete its travel through proper temperatures or zones of dissociation, or decomposition) is precipitated into the hearth of molten metal and is absorbed by and retained in the pig iron. The result is a product of very inferior quality. Its grading and shipment should be watched closely by furnace operators so as not to be applied on orders calling for first-class iron. The iron oxide referred to, when excessive, is very noticeable by its spongy-like, gritty appearance on the top of runners, sows and pigs, and by the excessive appearance of blow holes at the surface and throughout the metal.

Operation of the Furnace

Excessive driving or blowing of a furnace has its bad effect on the grade of metal by creating a tendency to "drive the life" out of it. That is, the gases are forced through the materials at such a high rate and pressure that they do not have proper time to remain in their respective zones for uniform distribution and functioning of their carbonizing and reducing agencies. The slow driven blast furnace—small or medium in size—working on easily reduced ores produces the most desirable grades of foundry pig irons.

Another form of "off iron" (high sulphur, low silicon) may be produced by the introduction of water into the furnace through a leaky cooler or tuyere, causing a cold hearth. The slag becomes less basic, the reduction of silicon decreases and absorption of sulphur increases. An interesting source of helpful information to the foundryman is a knowledge of the character of

raw materials used by the furnaceman in making the iron which he sells—more particularly knowledge of the ore. The limonites, or brown ores, are the most easily reduced compared with the more refractory hematites, therefore necessitate less driving of the furnace.

Reduction of Brown Ore

As an illustration of the smooth and complete working of a furnace using large percentages of easily reduced brown ores, as compared with refractory hematites, reference is made to the temperature at which decomposition begins and ends in the use of the two ores in a furnace. According to Hempel and Schubert, decomposition of the carbonates and oxides in brown ores begins at about 932 deg. and ends at about 2336 deg. Fahr.—the range of temperature of effective carbon deposition. Decomposition of hematites begins at about 2282 deg. and ends at about 2732 deg. Fahr. Therefore, dcomposition of brown ore begins between 10 to 12 ft. below the throat or top of furnace and is completed before it reaches the usual danger points of scaffolds and slips. Decomposition of the hematites does not begin until this danger zone is reached, then extends far down into it, and is not completed until practically the fusion zone (point of concentration of elements) is reached; hence the least disturbance or slip may cause the precipitation of iron oxide into the hearth. In addition to this, decomposition does not begin in the hematites until the ore is far down in the true zone of carbonization. Again, the brown ore in its preparation passes through a wider range of temperature, and consequent distance of travel in the furnace, than the hematite ore. This fact, in addition to the more porous nature of the brown ore by reason of losing its hygroscopic water, permits of a more complete deoxidation of the ore and proper carbonization of the iron sponge. The net result is a more uniform and superior product.

Bad Effect of Iron Oxide

Iron oxide is somewhat soluble, to a moderate extent, in liquid metal, but as a whole does not remain dissolved while the iron solidifies. The ferrous oxide (FeO) being very unstable absorbs additional oxygen, changing to ferric oxide (Fe_2O_3), thus supplying the oxygen which unites with the carbon of metal, throwing off carbon monoxide (CO) gas. The result is blow holes and segregation if the gas and oxide are trapped.

Iron oxide is probably directly or indirectly responsible for more foundry ills than any other agency. At times, unfortunately, a foundryman may receive from a furnace company iron which has been badly oxidized by irregularities of furnace practice. In this manner a large percentage of ferrous oxide may be carried through the cupola and temporarily, at least, held in solution with the liquid metal. On one occasion the author made a test of two heats by using several thousand pounds of a pig iron which had all the earmarks of being oxidized.

In this case, cupola conditions were checked closely and proved to be ideal. The metal came down hot, was held for several minutes in a 12,000-lb. ladle and skimmed several times. However, scoria would quickly reform on top of the metal. It was then transferred to small ladles, and by such process the agitation in pouring still further precipitated a large quantity of scoria which was also skimmed. In pouring the metal in molds the further agitation precipitated more slag, which passed through the mold and appeared on top of the riser metal. An analysis of this scoria was as follows:

	Per Cent		Per Cent
Silica	17.40	Iron Oxide	16.00
Alumina	3.30	Iron	60.00
Lime	None		

This is not strictly a slag, as no lime is present. The silica and alumina were doubtless gathered from the mold. The large percentage of ferrous oxide tells the story. It was a spongy and gritty mass of considerable weight — due to high percentage of iron. Castings were full of blow holes and pin holes beneath the surface, and always on the cope side. A change of pig iron, under identical cupola conditions, effected a speedy remedy.

STEEL STACK CONSERVATION

Encasing with Concrete to Save Chimneys on Point of Failure

Encasing with reinforced concrete is reported to have proved successful in conserving a steel stack, worn to a point of failure through corrosion, at the pumping station at South Works, Illinois Steel Co., South Chicago. After standing for a period of over two years, an inspection reveals nothing by way of defect, excepting superficial "craze" cracks. The concrete coating was not affected by gases from within or without.

The stack is 175 ft. high by 9 ft. in diameter, and is brick lined to the top. A reinforcing net-work of sufficient strength to make the new stack self-supporting, without relying on the shell of stack, was built up of rods and rectangular wire mesh and secured to the existing foundation bolts.

After this was done, a cement gun was then used to shoot guncrete or gunite, as it is variously called, against the steel shell to the required thickness. A mixture of sand and cement, hydrated in the nozzle, was applied with an air pressure of about 35 lb. The concrete is 18 in. thick at the base, tapered rapidly to 6 in. just above the bell base and gradually decreased to 4 in. at the top.

Angle iron box staging was used in the operation, begun at the bottom, and the cement and sand mixture was fed to the work by means of a hose. A 3 in. thickness was also applied to the breeching extending from the side of the boiler house to the stack. The plant was kept in operation during the entire period of reconstruction, and though the steel shell was so hot that it caused the water to steam, no deleterious effects were noted. The result was similar to that achieved in steam curing employed in other concrete operations.

Marked Improvement in Fabricated Steel

March contracting for fabricated steel structures amounted to 52,300 tons, or over twice the total for February. The average monthly rate of contracting over the last six months, including March, is 42,000 tons, a fact which is interesting in comparison with the rate of the six months immediately following the signing of the armistice, for which the average was 36,750 tons per month. The fabricating steel trade clearly went through a definitely duller period in the latter part of 1918 and the first part of 1919 than was the case in the last six months.

The records were collected by George E. Gifford, secretary of the Bridge Builders and Structural Society, and the amount for March is put as equivalent to 29 per cent of the capacity of the bridge and structural shops of the country, against 14 per cent for February and 18 per cent for January.

The Dravo Contracting Co., Pittsburgh, has been awarded a contract to construct a dam across the Mahoning River two miles below the plant of the Trumbull Steel Co. at Warren, Ohio. It will be 110 ft. between abutments and is built to form a pool to supply water to the new 600-ton blast furnace being built by the Trumbull-Cliffs Furnace Co. for the Trumbull Steel Co.

Failure of Steel Under Prolonged Stress

British Engineers Discuss Season Cracking in Ferrous and Non-Ferrous Metals — Causes of Intercrystalline Fracture—Defects in Rail and Tool Steel

(Special Correspondence)

LONDON, April 7.—A joint general discussion on "The Failure of Metals Under Internal and Prolonged Stress" was held yesterday at the Institution of Mechanical Engineers. It was organized by the Faraday Society and attended by members of the leading engineering and metallurgical institutions of the country. Three sessions were held, but this review deals only with the papers on iron and steel, those on non-ferrous metals being reserved for a later article.

Intercrystalline Failures

Dr. W. Rosenhain opened the discussion with a general survey of the subject, explaining that by prolonged stress was meant continuously applied stress and not any of the types of alternating or intermittent stress. Metallic fractures usually passed through the crystals but sometimes they were intercrystalline, and it was failures of the latter type that formed the subject of the discussion. In such cases the time factor came into play and the stresses were usually not working stresses but internal. Until 1919 the phenomena of season cracking stood as isolated facts in the working of brass and nickel-silver, but they were now known in several other metals and alloys.

The speaker considered that a sound explanation must be applicable to all metals and not alone to brass which had been chiefly studied hitherto. Possible explanations were: (1) The simple stress theory, which, however, was put out of court on several grounds. (2) The recrystallization theory. As regards this, there was no evidence to show or even suggest that recrystallization took place in cold-worked brass. (3) General corrosion. This was completely disposed of by the recent work of Moore. (4) The amorphous film theory. This was not invented for the purpose of explaining season cracking, and was now found to offer an excellent explanation of all the phenomena.

The speaker adduced considerable evidence for the existence of the intercrystalline viscous material. In reference to the amorphous film theory, the question of the microstructure was of great importance. Smooth crystal boundaries facilitate season cracking, while with jagged boundaries it was difficult to get cracking. There was abundant experimental evidence on this point. In brass, for example, the crystalline boundaries were nearly always smooth and no treatment affecting the microstructure would render brass not liable to season cracking, although low temperature annealing, by removing the internal stresses, would prevent such cracking.

Among other explanations of season cracking might be classed objections to the amorphous film theory of a purely fanciful nature [the speaker here obviously referred to the criticisms of Dr. W. H. Hatfield] which might be disregarded. A more serious explanation was that involving chemical action or corrosion. Such action was not essential, but was a powerful accelerating cause. A small viscous flow of the amorphous intercrystalline film would disturb the accumulated products of chemical reaction and so allow the reagents to continue to act.

Following Dr. Rosenhain's remarks, various papers were presented and discussed. The following had reference to iron and steel:

Intercrystalline Fracture in Steel

A paper with the above title by D. Hauson, of the National Physical Laboratory, covers a number of examples of failure, details of which have already been published by the author or Dr. Rosenhain and his collaborators before other technical societies.

The author observes that intercrystalline fracture in steel, as in other metals, is by no means uncommon. It is found, for example, in ingots which have cracked at a high temperature, in metal which has been burnt, and in steel which contains intercrystalline impurities of a brittle character. It has also been described, in the case of pure iron, after certain kinds of heat treatment in an atmosphere of oxygen at a very low pressure, and in the case of heat treated nickel-chrome steel which has been rendered brittle by slow cooling after tempering. In all the above cases the type of fracture does not appear to depend to any large extent on the nature of the applied stress, and the fracture is intercrystalline even when it takes place very rapidly. It is particularly interesting to note that this has been found to be the case in nickel-chrome steel both by Philpott and Archer, when the material was broken very rapidly in a notched bar impact test.

The cases of failure which the author discusses are those which occur only under certain circumstances, in material of normal quality, when the time during which the stress is applied is prolonged. In most of the cases evidence is available to show that, if rupture is produced rapidly, as in a tensile or impact test, the fracture is transcrystalline.

Several cases have been observed in mild steel boiler plates which failed in service and these are briefly recapitulated.

Causes of Season Cracking

Dealing with the causes of season cracking, the author observes that at the present time it is recognized that season cracking takes place with great readiness in some materials under the action of corrosive influences, and it has been supposed by a number of workers that such corrosive action is necessary for the development of intercrystalline cracks. There can be no doubt that certain substances have the power of rapidly attacking the intercrystalline material in a metal under stress, and in many instances the presence of a corroding agent is necessary for the rapid development of season cracking. In the cases which have been described in this paper, the possibility of corrosion of the steel is present, and this factor must be considered in arriving at any explanation of the phenomenon. In all the cases examined definite corrosion of the cracks was visible in polished sections, but it is difficult to determine whether such corrosion preceded the formation of the crack or whether it occurred as the result of the penetration of corrosive fluids after the crack had been formed by the action of other causes. While it seems difficult to prove that corrosion has not played a part in cracking of this kind, there is evidence to show that corrosion may proceed without in any way following the crystal boundaries.

Corrosion in Boiler Plate

Cases of failure in boiler plate steel of the same quality as that of the plates described in this paper have been found in which corrosion appears to have played a very important part. In these cases cracks were observed to start always from the side of the plate in contact with the liquid in the boiler, and to spread gradually through the material in a direction practically at right angles to the surface of the plate. These cracks ran both longitudinally and transversely across the plate, and were not confined to the region in the neighborhood of the rivet holes. They were as a rule much wider than the intercrystalline cracks which have already been described, and were also found

to be filled completely with the products of corrosion.

From the evidence given by the author it is clear that corrosion of boiler plate steel may take place, both under conditions which exist in the working of the boilers, and under conditions of atmospheric corrosion without any preferential attack of the material in the crystal boundaries. In certain cases of season cracking which are ascribed mainly to corrosion, definite evidence has been produced to show that under certain circumstances preferential attack of the material in the crystal boundaries can take place; in the present examples no such evidence has been found. On the other hand it is believed that in some metals corrosion can play little or no part in the phenomenon of season cracking, and that the main factor is the existence of a severe internally applied stress.

Cracks in Hardened Steel

It is well known that hardened steel articles frequently develop cracks after the hardening operation has been carried out. Such cracks may not occur for some hours or even days after hardening, and it is further recognized that the formation of cracks is more likely to take place in articles of irregular cross section and in articles which are not heated to a uniform temperature before hardening. These latter conditions necessarily imply the existence of severe internal stresses in the hardened articles. Such spontaneous cracks are frequently "intercrystalline" in character, in the sense that they follow the boundaries of the austenite crystals which existed at the moment of quenching. There is no reason to suppose that the amorphous boundary films are altered in character by the action of quenching. They do not appear to be weaker than the material of the crystals under the conditions of the ordinary mechanical tests—tensile, bend and notched bar tests—in which fracture normally takes place through the crystals.

In conclusion, the author states that there is no reason to suppose that iron and steel differ essentially from non-ferrous metals in regard to season cracking, and it appears probable that, under the influence of suitable accelerators, more rapid failure could be induced. Examples quoted in this paper, however, appear to indicate that such failure can occur as a result solely of the stresses, internally or externally applied, to which the material is subjected.

Fractured Boiler Tubes

Sir Henry Fowler presented a paper on "Fractures in Locomotive Boiler Tubes." The failures occurred in an engine of the Midland Railway.

After having run about 60,000 miles the engine came into the repair shops in the middle of 1919, and the tube ends in the firebox being slightly burned arrangements were made as is the custom to drive the tubes up from the smoke box end. At the first blow the end of the first large tube to be operated on fractured. Investigation showed that of the 21 large tubes, 8 had brittle ends, while 13 were fairly malleable.

The tubes were lap-welded, and it was obvious that the "steel tube strip" from which they were made was in both cases of poor quality. It will be appreciated that the use of this class of steel was entirely due to the war conditions prevailing. Microscopic examination showed that the impurities were largely concentrated in the boundaries between the crystals, and that the fractures were generally found to be intercrystalline.

Chemical analyses showed that tubes with brittle ends were unduly high in phosphorus, which was generally between 0.14 and 0.16 per cent, while tubes with malleable ends averaged 0.07 per cent of phosphorus.

It might be suggested that the brittleness of the tubes is due to the original stresses set up in expanding. In order to ascertain if this were the case, portions of two separate "brittle" tubes were taken from unaffected parts of the tube made into rings and expanded in the usual way. The Brinell hardness was in one case increased from 111 to 156, and in the other from 131 to 143, but in neither case did the metal become brittle.

The author suggests that the brittleness is due to the repeated stresses set up during the work of the locomotive acting on material already in a state of stress, regard being had for the high phosphorus contents of the metal. On the Midland Railway there are about 6000 of these tubes in service, and with one odd exception, these 8 tubes are the only ones known to be brittle. The phosphorus in the great majority of the tubes in use may be taken as being low.

Fractures in Rails

Henry S. Rawdon, physicist in the Metallography Department of the United States Bureau of Standards, is the author of a paper entitled "The Presence of Internal Fractures in Steel Rails and Their Relation to the Behavior of the Material Under Service Stresses."

In a summary of his results the author states that discontinuities or internal fractures exist in considerable numbers in some types of steel rails as well as in some other wrought steel products. These may be readily revealed by deeply etching sections of the material. A method of showing their presence without changing in any way the characteristic features of these internal defects depends upon magnetizing the specimen and then bathing it in a suspension of fine iron dust in oil. The origin of these discontinuities is still somewhat in doubt. They evidently serve as the "nucleus" or starting point from which larger defects, termed "transverse fissures," grow under the stress conditions to which the rails are subjected in practice. While the failure of rails by the formation of transverse fissures is one of the most serious and dangerous types occurring in American rails to-day, it is not to be concluded that all rails are prone to this defect.

Mild Steel in Salt Solutions

A communication from the Research Department, Woolwich, by J. A. Jones, deals with "Intercrystalline Cracking of Mild Steel in Salt Solutions." The author carried out a series of experiments with mild steel plates in a condition of stress due to riveting or to clamping in a bent position. These were subjected to the action of various salt solutions at temperatures between 100 deg. C. and 150 deg. C. and to fused salts at 250 deg. C.

The author concludes that one of the determining factors in the production of cracks is the presence of internal or applied tensile stress, and fracture occurs only when these stresses are above a certain value.

There is no evidence that internally stressed steel (in the unhardened condition) is liable to crack spontaneously at ordinary temperatures. Moreover, a condition of slightly elevated temperature alone has not been found to be responsible for producing cracks in such material. Stressed specimens which remained uncracked for four weeks in a fused salt bath at 250 deg. C., 15 weeks in calcium chloride solution at 150 deg. C. 14 weeks in sodium carbonate solution at 127 deg. C., or 14 weeks in air at 100 deg. C., all cracked within a few days when heated in calcium nitrate solution at 148 deg. C.

This property of inducing rapid cracking in stressed steel has been observed in the case of solutions of sodium, potassium, calcium and ammonium nitrates. A similar action of solutions of caustic alkalis is already well known. In all cases the cracks produced by the solutions are intercrystalline; under similar circumstances a medium carbon steel both in the annealed and in the sorbitic condition did not crack.

Hydrogen Absorption

Both Andrew and Merica attribute the formation of intercrystalline cracks in mild steel after treatment in caustic soda solutions to weakening of the grain boundaries by the absorption of hydrogen by the intercrystalline amorphous material. Further support for the view that cracking in potassium hydroxide takes place through the agency of hydrogen is given in the paper. It seems clear that solutions of nitrates also yield a product having selective action on the intercrystalline material whereby intercrystalline cohesion is reduced. It is suggested that in this case the active agent is nitrogen or an oxide of nitrogen.

The addition of sodium nitrate solutions of sodium

carbonate, which would reduce the dissociation of nitrate in solution and might thus tend to check the reaction, was found to retard the rate of cracking. In the absence of applied or internal tensile stress penetration cannot be appreciable, since the action appears to be without detriment to the properties of the steel, in the absence of stress.

Failure of Tool Steel

The most valuable paper among these devoted to iron and steel was that by J. Neil Greenwood, on "The Failure of Metals Through the Action of Internal Stress Irregularities, with Special Reference to Tool Steels." The author deals exhaustively with the possible origins of internal stresses in pure metals and alloys, which fall into two main classes, namely, those due to cold working and those due to suppression of phase changes by rapid cooling. Consideration is also given to the volume changes taking place during the heating and cooling of steel. In this connection three factors are considered: (1) The change from alpha to gamma iron, involving a contraction of 0.5 per cent by volume. (2) The solution of iron carbide, involving an expansion of variable amount. (3) The change from alpha to beta cementite, involving a very small contraction.

The difference in expansion coefficient between alpha cementite and alpha iron is emphasized. This is of special importance in connection with the clinking of high carbon ingots. The conditions covering the hardening of steel are set out in detail and the volume changes causing the internal stresses are analyzed. The phenomena of spontaneous change are examined in the light of results published by Matsushita, the relief of stresses by tempering hardened steel is explained, and the influence of free carbide and non-metallic inclusions in weakening the steel is shown to be similar. Manganese and chromium are shown to reduce internal stress irregularities by making the quenching effect more uniform through the piece.

Internal Service Strains

A paper was communicated by James E. Howard, engineer physicist of the Interstate Commerce Commission, Washington, D. C. This was entitled "Internal Service Strains in Steel," and emphasized the fact that attention has commonly centered upon the original properties and characteristics of steel, and the means by which these original properties are modified, overlooking the wide range of conditions which affect the endurance of the metal, the phases through which steel pass under conditions of service, and which lead in the direction of ultimate rupture.

Discussion

F. W. Harbord said it seemed that almost every case of fracture was due to a different cause, but in most cases internal stress was prominent. Manufacturing stresses could usually be removed by suitable heat treatment.

Dr. W. H. Hatfield said he had examined the tubes mentioned by Sir Henry Fowler and they were one of the very few examples of truly brittle steel, breaking off short on tapping lightly with a hammer. He thought the high phosphorus had much to do with it. As regards the cracking of hardened steel, this was most often through and not around the grains, and was due to unequal cooling.

Professor Jenkin suggested that if the fracture took place quickly the crack might pass through the crystal, and if slowly it might be intercrystalline.

L. Archbutt mentioned a steel barrel being rolled over some stone setts which had suddenly cracked three-quarters of the way around, the cracks being mainly intercrystalline.

Dr. Rosenhain thought intercrystalline fractures could not be disposed of so easily as Mr. Jones had done in his paper, and that the author was much mistaken in assuming that it was definitely established by previous investigators that the cracking of mild steel boiler plates was due to chemical action.

Prof. A. W. Porter said he had had interesting experience of the action of salt solutions on mild steel plates in the case of evaporating pans. When used for brine they simply rusted through in course of time, but when used for evaporating sodium nitrate, after being used a short time for ordinary salt, they did not rust but cracked right across in a few days. There was no doubt in these cases that the cracking was due to chemical action. One could pick out from the scrap heap pieces of iron from salt and niter pans respectively—the former were rusted while the latter were cracked.

British Low Carbon Rails Exempt

E. H. Saniter thought that Mr. Rawdon's granular nucleus was nothing but the result of the cooling conditions on such high carbon rail steel as used in the United States. In this country, where lower carbon rails were used, these defects were never experienced.

D. Hanson said he did not understand Dr. Hatfield when he said that fractures went through instead of around the grains "in nine cases out of ten as often as not," and he did not agree that in high carbon steels the fractures were generally across the crystals. The fractures under discussion were slowly produced and in such cases were usually intercrystalline.

Sir H. Fowler confirmed Mr. Saniter in his statement that the failures described by Mr. Rawdon were not met with in British rails.

J. A. Jones was glad to hear Mr. Harbord point out that suitable heat treatment would obviate season cracking. He still held to his opinions on chemical or corrosive factors, in spite of Dr. Rosenhain's criticisms.

Standardization to Be Discussed by Gear Manufacturers

The Fifth Annual Meeting of the American Gear Manufacturers' Association will be held in Hotel Sinton, Cincinnati, April 27 to 30, inclusive. Standardization and uniform cost accounting will be among the subjects discussed and important action is expected by the association, tending toward the establishment of a more complete standardization of the products of the gear industry.

The program includes addresses by G. M. Bartlett, Diamond Chain & Mfg. Co., Indianapolis, on "The Ideal Chain and Sprocket Drive"; by A. R. Mitchell, Andrews Steel Co., on "Industrial Gears from the User's Standpoint"; by J. B. Foote, president Foote Brothers Gear & Machine Co., Chicago, on "Worm Gearing," and by J. B. Doan, president American Tool Works Co., Cincinnati, whose subject has not been announced.

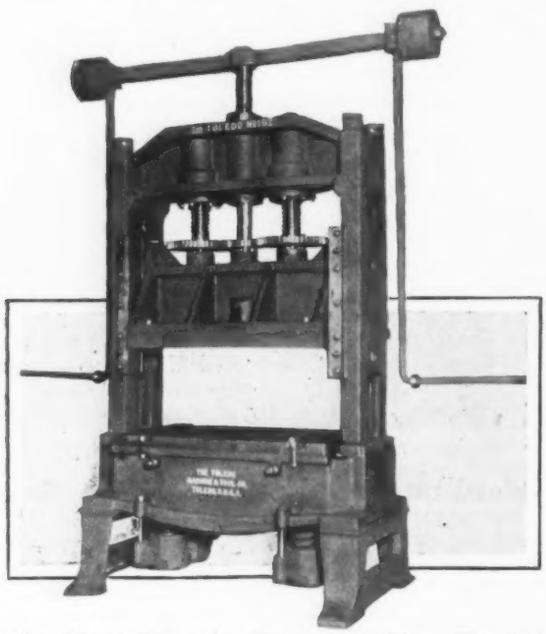
At a luncheon on Thursday, April 28, Hon. George Wilder Cartwright, United States Senator from California and member of the Senate Industrial Relations Committee, will speak on "The Price of Success in America." The usual informal banquet of the representatives and friends of the association will be held Friday evening, April 29, with the president, F. W. Sinram, president Van Dorn & Dutton Co., Cleveland, acting as toastmaster. The speakers will be Edward S. Jordan, president Jordan Motor Car Co., whose subject is "Looking Ahead," and Charles Woodward, vice-president in charge of personnel, Hydraulic Steel Co., who will discuss "The Human Element in Business." On Thursday afternoon the members of the association will make an automobile tour of Cincinnati as guests of the Cincinnati members and their friends in the machine tool industry.

The nominating committee of the Cleveland Engineering Society, Cleveland, has selected the following candidates for the ensuing year: President, F. H. Vose, professor of mechanical engineering at Case School of Applied Science; vice-president, Clarence L. Collens, president, Reliance Electric & Engineering Co.; directors, J. B. Dillard, Cleveland Twist Drill Co., C. N. Osborn, city manager of East Cleveland and L. C. Drefahl, chemical engineer in charge of research department of the Grasselli Chemical Co. These will be formally elected at the next meeting.

Large Double Screw Press

To meet a demand for a large screw press with sufficient capacity and bed area to try out sheet metal blanking, forming, drawing, stamping and other dies which are too large for the ordinary single screw press, the Toledo Machine & Tool Co., Toledo, Ohio, has designed and built the large double screw press shown in the accompanying illustration. Below are some of the principal dimensions:

The weight is about 14,000 lb.; area of bed, 30 x 54 in.; opening in bed, 20 x 48 in.; area of slide, 24 x 49 in.; shut height on top of bed, 14½ in.; open height on



Double Screw Press for Trying Out Dies. The bed is arranged with a spring pressure drawing attachment for combination and deep forming dies

top of bed, 32½ in., and thickness of bolster plate, 2½ in.

The press is fitted with two 4-in. diameter screws. The bed of the press is arranged with a spring pressure drawing attachment, which is used when trying out combination and deep forming dies.

Chicago Machinery Club Installs Officers

At its annual meeting held in the club headquarters on April 19, the Machinery Club of Chicago installed new officers and trustees for the coming year. J. R. Porter, general manager the Marshall & Huschart Machinery Co., who had been vice-president of the club the previous year, was made president, succeeding R. R. Cuthbertson, local manager Manning, Maxwell & Moore, Inc. H. E. Procunier, president the Moon Mfg. Co., was elected vice-president; A. G. Bush, Minnesota Mining & Mfg. Co., was re-elected secretary, and Henry J. Reeve, the Dale Machinery Co., was re-elected treasurer. H. F. Kempe was elected assistant secretary. The new trustees include H. S. White, the Cleveland Twist Drill Co., A. W. Smith, the L. S. Starrett Co., and S. A. Ellicson, the Chicago Pulley & Shafting Co. The Machinery Club of Chicago now has a total membership of 902, of which 140 are non-residents. During the past year, the club increased its space by 50 per cent and accepted an option on the remainder of the floor on which it is located. For the time being, this unused space is being sublet.

Ohio State Foundrymen's Association

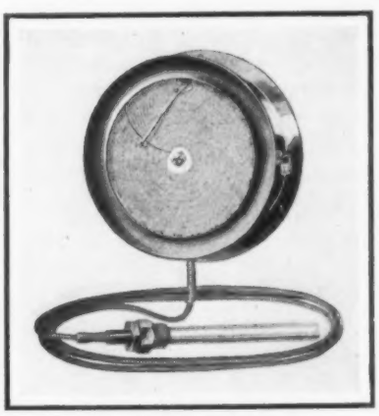
The Ohio State Foundrymen's Association recently organized, will hold its first general meeting at the Miami Hotel, Dayton, Ohio, Tuesday, May 3. It is the plan of the association to hold four general meetings each year in different sections of the State. The association now has 80 members and it is expected that in a short time it will embrace practically every foundryman in the State. At the morning session, there will be a general discussion on subjects relating to the foundry business. At the afternoon session, addresses will be made on "Labor" by Samuel Powell, Jr., Hamilton, Ohio, secretary of the Ohio State Foundrymen's Association, E. T. Runge, Cleveland, on "Foundry Costs" and E. F. DuBrul, general manager of the National Macine Tool Builders' Association, with headquarters in Cincinnati.

Improvements to Recording Thermometer

The Brown Instrument Co., Wayne Junction, Philadelphia, is offering a recording thermometer which is an improvement over its previous designs and among other uses is adaptable for measuring the temperatures of quenching baths, oil tempering baths and core ovens.

The Seth Thomas clock movement used is attached to the front plate and arranged for easy removal for cleaning. To make the instrument moisture proof a rubber gasket is fitted in the door, which is squeezed tightly when the door is fastened down. Clips are mounted on the door and swing aside automatically when the door is opened, eliminating the necessity of slipping the chart under each clip.

The helix is assembled with the pointer setting device and staff in one unit. A patented method for calibrating the instrument is provided, by means of which the instrument may be readily adjusted if after continuous service the pen travel does not correspond with the chart. A pen release automatically lifts the pen from the chart when the door is opened and replaces it when the door is closed. The pen is inverted so that the ink cannot run down the arm and the pen is set by the turning of a knob, an arrangement which eliminates the necessity of bending the arm with the fingers.



Improved Brown Recording Thermometer

By the turning of another knob the pen may be made to bear more heavily or lightly on the paper, as desired.

At the first annual meeting of the Kelly Reamer Co., Cleveland, in its new plant on April 16, the retiring board of directors was re-elected for the ensuing year. The officers are: H. C. Putnam, president and general manager; W. A. Calhoun, vice-president; H. W. Strong, treasurer; A. C. Carter, secretary; G. H. Moore, assistant secretary; J. M. Davie, chief engineer. This company recently increased its capital stock from $60,000 to $250,000 and all shares offered were taken up by the present stockholders. An opportunity was afforded all the stockholders to inspect the new plant and the additional equipment which has recently been installed.

Evidently anticipating a better business in tinplate than in sheets, the Trumbull Steel Co. is converting a number of the sheet mills at its Trumbull works at Warren, Ohio, into tin plate units. The mills are interchangeable, but the transposition requires the construction of new furnaces and addition of other equipment.

PLANT OPERATIONS

Detroit Employers' Association Reports Increased Activity—Notes from Other Centers

During the week ending April 19, the Detroit Employers' Association, comprising 79 plants of the largest size, employed 6440 new men, bringing the total to 106,789. This should bring the total factory employment of the city, including non-member plants, well above 200,000. Twenty-one firms are on a reduced schedule, averaging 39 hours a week. These firms employ only 6051 men.

The plate mill and No. 2 puddle mill at the Girard plant of the A. M. Byers Co., Pittsburgh, resumed operations April 25, after being wholly suspended for several weeks. The puddle mill contains 44 furnaces, half of the puddling capacity of the plant.

The Columbus plant of the Timken Roller Bearing Co. resumed operations with a reduced force on April 20 after a shut-down of five months. It is expected that operations will gradually increase until 1000 men are employed.

Only six of the 46 blast furnaces in the two Valleys are now active—two in the Ohio Works group of the Carnegie Steel Co.; two in the East Youngstown battery of the Youngstown Sheet & Tube Co., one of the Republic Iron & Steel Co. and one of the Brier Hill Steel Co.

The Walden-Worcester, Inc., Worcester, Mass., wrenches, is one of the few New England plants running full. The plant is operating around 50 hours per week with more than 100 on the payroll. It has some export business, but is chiefly engaged on domestic orders. The company recently placed on the market several new sets of wrenches adaptable for the automobile repair, garage business, etc., and is well booked on orders. Previous to the revival in the automobile industry, the company gave much attention to the adjustment of jobbers' stocks. As a result of this campaign, less than 10 per cent of the jobbers in the country have more than normal and a majority less than normal stocks.

The Boston & Albany Railroad Co., West Springfield, Mass., locomotive shops, which closed March 26, reopened last Monday with 435 men on the payroll.

The plant of the Jeffrey Mfg. Co., Columbus, Ohio, which had been closed for inventory, resumed operations with a full force of 2500 men on April 20. For the present the plant will be in operation two days each week, but it is hoped before long to increase the operation until the full time schedule has been restored.

The American Seeding Machine Co., Springfield, Ohio, closed for an indefinite period on April 22. Advantage will be taken of the shutdown to take inventory and make repairs of its machinery.

The Milwaukee Rolling Mill Co., Milwaukee, organized a year ago with a capital stock of $1,500,000 to build and operate a sheet steel mill, placed the plant in operation for the first time on April 19, with an initial unit of eight sections and a force of approximately 1000 operatives. The works are situated at Forty-third Avenue and Burnham Street, in West Milwaukee, and the maximum capacity is 60,000 tons of black, blue, annealed and galvanized sheets, annually.

The plant of the Indiana Stove Works, Evansville, Ind., closed since Christmas, has reopened with 50 men, one-third of the normal force.

Following operations on about a 30 per cent basis since the first of the year, the Richardson & Boynton Co., Dover, N. J., manufacturer of stoves, ranges, etc., closed its plant April 16, until further notice. About 250 men are thrown out of employment. Normally, the plant employs 650 men.

The John Wood Mfg. Co., Conshohocken, Pa., manufacturer of boilers, tanks, etc., increased its working force on April 11, taking on a number of former employees.

The locomotive shops of the Philadelphia & Reading Railroad at Reading, Pa., resumed operations on April 11, giving employment to about 1200 men. The plant has been idle for about three weeks.

Effective April 14, the Landis Tool Co., manufacturer of boring mills, grinders, etc., has closed its Waynesboro, Pa., plant for an indefinite period. A similar order will be effective at the company's Greencastle, Pa., plant within a fortnight, as soon as current work is completed.

Smaller Shipments from the Soo

In a statement covering the nine months' period ending with March 31, the Algoma Steel Corporation, Sault Ste. Marie, Ont., points out that smaller shipments of iron and steel were made in recent months. Dispatches from Sault Ste. Marie, recently said that efforts were being made by the Board of Trade and citizens to secure orders to keep the mill running, and more recent advices state that Government orders were expected within a short time. Lack of stabilization in prices of steel products has made for dullness generally in this field of industry. Unfilled orders for iron and steel at the end of March were approximately 20,000 tons. The rail mill was closed March 19, after completing two contracts, but mills were in operation at the end of the month, making rail fastenings, merchant bars and small shapes. Negotiations with the Canadian Railways for the purchase of rails have been in progress for some time, and the directors expect to close contracts shortly for a satisfactory tonnage. The demand for pig iron shows an improvement. The output of the coal companies has been very much curtailed during the past three months owing to lack of orders, but a greater demand for coal is looked for with the opening of navigation. Owing to the unfavorable outlook for the sale of ore, the Magpie mine was closed March 9. Sufficient ore is in the stockpile at the mine to provide for the requirements of this grade for the rest of the year. Comparative output for the past nine months with comparative figures for the previous year are as follows:

	Nine Months to March 31, 1921 Tons	Nine Months to March 31, 1920 Tons
Magpie ore	137,211	180,761
Coke	346,325	303,611
Pig iron	292,083	199 558
Steel ingots	251,629	223,832

Increase Coking Operations

UNIONTOWN, PA., April 25.—Independent activities in the Connellsville bituminous coal and coke field continue to show some increase. A number of the smaller plants are resuming operations in part on small orders, some secured through price shading with the view of getting started in order to be prepared for the better business believed to be due in the near future.

The past week has seen additional inquiries for both coal and coke, although the amount of new business placed will not aggregate a large tonnage. The continuance of the British coal strike has brought about some inquiries for export coal for Britain; a few inquiries have been received for South American dealers and some export business of a minor nature has been done. However, most of such fuel is being bought by dealers under competitive bidding and an effort is generally made, it is said, to disguise the destination.

Independent operations in the region will now exceed 20 per cent, and probably are near 25 per cent, as a result of increased work at the smaller plants. H. C. Frick Coke Co. production is 18 per cent and coal output 45 per cent, most of the coal going from the Klondike region plants in the county to the Steel Corporation's by-product ovens at Clairton.

TARIFF LEGISLATION

Progress Not Being Made as Fast as Hoped for—Decision Not Reached on Some Sections of Metal Schedule

WASHINGTON, April 26.—While the metal schedule of the permanent tariff act has been tentatively completed with certain exceptions by the subcommittee headed by Representative John Q. Tilson, it has not as yet been laid before the full Committee on Ways and Means. The subcommittee is prepared to submit it to the full committee as soon as the latter is at liberty to consider the recommendations, but delays have been encountered by the full committee and the bill, which was expected to be ready for introduction in the House early in May, probably will not be reported until a later period, the time of which is indefinite. During the past week, the subcommittee on metals, other subcommittees and the full committee, have granted conferences with various interests regarding tariff legislation, among them being the Southern Tariff Association, which is appealing for protection on agricultural, mine and manufactured products, the claim being made that the South is in urgent need of protection because of depressed agricultural and industrial conditions.

Of the 90 paragraphs in the metal schedule, there are still 10 which have not been framed entirely and are being given consideration. Their nature has not been made known. The independent steel producers, however, have shown considerable concern over the duty that may be placed on ferromanganese and have appealed to the subcommittee not to place too high a tariff on this product, and some have urged that it be admitted free. Certain reports as to what action the subcommittee may take cannot be verified and it has been suggested that this product is involved in one of the unfinished paragraphs. Ferrosilicon is among the products for which the Southern Tariff Association has recommended a duty, suggesting 3c. per lb. on silicon content of 6 per cent and over. Its schedule rates submitted through the minerals division to the full committee also included zinc and oxide of zinc.

While an organized plea for protection from the South has been looked upon by some as a political and economic phenomenon, by others it is accepted merely as reflecting the evolution of diversified interests which have developed in that section of the country and therefore is entirely natural. There always has been, it is pointed out, a sentiment in the South, as well as in other sections, for protection for its interests where it was considered this was necessary, part of it coming from iron and steel and sugar interests. The association, in seeking quick action on permanent tariff legislation, has asked for the passage of a joint resolution by Congress which would make the new rates effective from the day the bill is introduced in the House. They contend that ad interim legislation is necessary to prevent a rush of imports while tariff legislation is being considered. Some who oppose the joint resolution mentioned claim that the anti-dumping and exchange provisions of the emergency act will afford ample security against the contingency the association has feared and expressed, both to the President and the House Committee on Ways and Means.

Delay in the Senate Committee on Finance in reporting the emergency bill because of hearings on the anti-dumping and exchange provisions has made it less necessary, it is claimed, to hurry action on the permanent bill in the House, which, it is apparently expected, can pass the latter measure by the time the Senate has acted on the emergency legislation. Hearings before the Senate committee were extended so that it was not possible to introduce it as early as Chairman Penrose had expected and its final passage also likely will take longer than at first believed because of the proposal to revise both the anti-dumping and exchange provisions which were consolidated by the House with the emergency bill itself.

Small Imports of German Metal Products

WASHINGTON, April 26.—Germany is making a really remarkable commercial recovery, indicating fulfillment of predictions that she is forging ahead again as a formidable competitor in the world's markets. This is made evident by detailed figures for the calendar year 1920, prepared by the division of statistics, Bureau of Foreign and Domestic Commerce showing imports to the United States from that country.

While aggregate totals have been published, this marks the first time the data have been made available in detailed form since the pre-war period. Although still greatly below the volume shipped to the United States before the war, the imports of 1920 reveal a vast gain, the total being valued at $88,836,280, as compared with $10,608,141 in 1919. Even allowing for the higher prices of 1920, the growth in the actual volume, as well as the value, is a decidedly large one. The imports in 1920 are not quite half of the trade of the record years, the totals having been $184,211,352 in 1913 and $186,042,644 in 1912.

But imports of iron and steel products, machinery, non-ferrous metals were small. Cutlery imports, however, were relatively large. Under the iron and steel classification, which embraces cutlery and machinery, imports to the value of $5,334,794 were shipped from Germany to the United States. Of this sum cutlery imports were valued at $1,516 931, while the machinery shipments were valued at $1,799,187. Wire and its manufactures are the only specified mill products listed under iron and steel and were valued at only $154 587. "All other steel" imports were valued at $1,279,099. Imports of metals, metal compositions and their manufactures were valued at $1,219,637.

To Extend Foreign Trade

WASHINGTON, April 26.—Among efforts being made by British manufacturers to secure world trade in the Cadiz, Spain, consular district, according to a report made to the Bureau of Foreign and Domestic Commerce by American Consul B. Harvey, is the use of well arranged and intelligently distributed catalogs and trade lists in Spanish. While observing publications showing leading American manufacturers, Mr. Carroll makes the suggestion that American trade associations and selling organizations, as well as Chambers of Commerce, issue special publications on their respective cities and send copies to the Cadiz Chamber of Commerce through the Consulate. This suggestion would seem to apply as well to other American consulates.

Machine Tool Builders Cancel Convention

The National Machine Tool Builders' Association announces that its spring convention, scheduled for May 19 and 20 at Atlantic City, N. J., is cancelled.

The triple convention of the American Supply and Machinery Manufacturers' Association, the National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association will be held on May 16, 17 and 18, as planned, it having been erroneously reported that this convention also would be cancelled.

Princeton University has announced that, beginning next fall, instruction would be offered in mechanical, electrical, chemical and mining engineering, and degrees in those branches of engineering will be conferred. Civil engineering is now the only branch of engineering taught at Princeton. Summer work will be required in several of the new courses, analagous to the summer surveying now required for the present course.

The Federal Trade Commission in announcing the dismissal of its complaint against Rogers, Brown & Co., New York, respondents in the unfair competition case against a number of importers of ferromanganese, stated that the conduct of the case as to the other respondents is not affected by the dismissal as to Rogers, Brown & Co.

PLANT BUILDING PROBLEMS

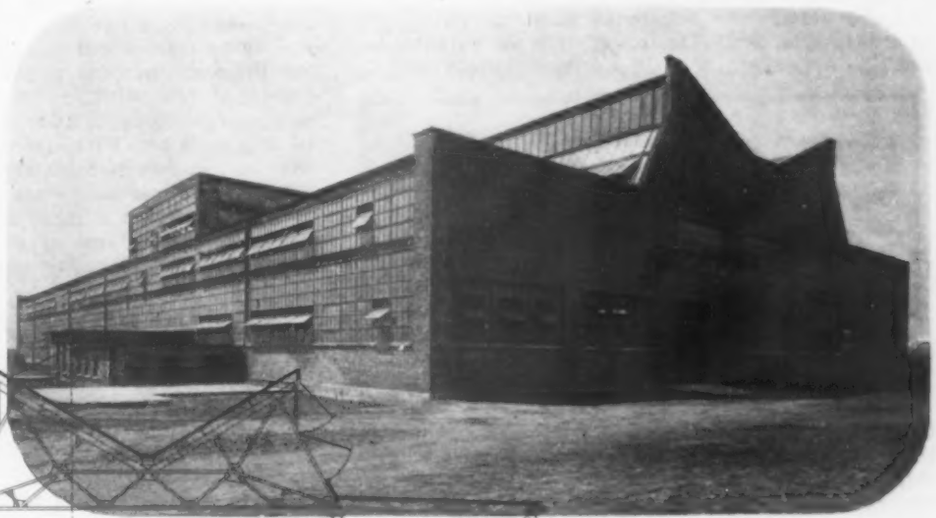
Shop Used for Making Concrete Mixers to Be Converted to Malleable Iron Foundry

Designing a building whose immediate usage is for making concrete mixers and pavers and which is to be converted later into a malleable foundry, making a core building of a combination of reinforced concrete and structural steel and adding a modern extension to an old foundry building were some of the problems undertaken for the Chain Belt Co. on a recently acquired tract at West Milwaukee by Frank D. Chase, Inc., Chicago, industrial engineer. The new tract was purchased because the company's former ground space in Milwaukee limited necessary extensions. The first four units have been completed.

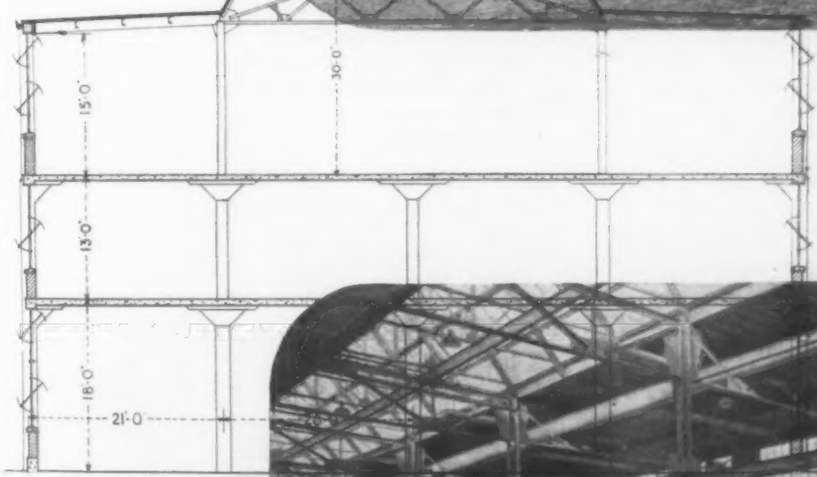
In the building now used for making mixers, later to be used as a malleable iron foundry, ample use of steel sash with a Pond truss roof construction insures well-distributed daylight throughout the building. The high bay shown part way down the length of the plant on the exterior view is over what will be the future location of the malleable furnace when the building is turned over to foundry duty. At that time the building will also be extended 50 per cent of its present length, thus making room for four furnaces.

The core building is somewhat unique, in that it is a combination of reinforced concrete for the first two floors, and structural steel construction for the third floor, representing very well the idea of special design for a special purpose. The first floor is used for pattern and baked core storage, the second for metal pattern shops, and the third for core making. The design of the roof, with proportionate arrangement for the inflow of fresh air, disposes of hot gases and smoke, so that the clear working conditions and perfect lighting is at once apparent upon entering this room.

To the foundry building which was already part of the plant, a new section has been added. To one entering this foundry, the difference between the new and old sections is strikingly apparent, because of the distinctly better lighting afforded by the use of A-frame roof construction, and the use of generously proportioned steel sash. An idea of the even distribution of light in this new foundry extension is given in the illustration.



This Building Was Designed for a Twofold Purpose: First, for Making Concrete Mixers and Pavers; Second, to Be Converted to a Malleable Foundry.



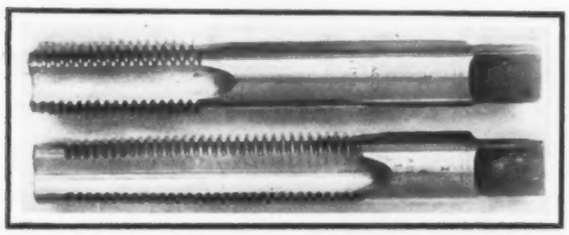
Cross Section of the Core Building, a Combination of Reinforced Concrete and Structural Steel Design.

This New Foundry Extension Presents a Contrast to the Older Portion of the Building.

Recent Development in Taps

A recent development in the design and manufacture of taps is shown in the roughing and finishing taps illustrated. They are being marketed by John Bath & Co., Worcester, and are offered as producing threaded holes of unusual accuracy; as practically eliminating tap breakage; and, because of improvement in cutting qualities over the ordinary fire finished tap, it is further claimed that they open the way to greatly increased production.

The roughing tap has a pilot and the first few threads are similar to the U. S. standard, gradually taking the Acme form. The pilot squares the tool concentric with the hole and being well tapered, the tap starts with ease and the cutting is distributed over its full length. Alternate side of the teeth are relieved so that only one side of a tooth is cutting. It is claimed that the



Roughing and Finishing Taps of Recent Development. Alternate sides of the teeth are relieved so that only one side of a tooth is cutting. The teeth are intended to have the cutting action of a lathe side tool

teeth have the cutting action of a lathe side tool rather than that of a series of broad nose tools, and rolls the chips out freely into the clearance of the flutes. The free cutting qualities thus obtained are found to obviate the jamming of chips in the flutes, and to reduce greatly the effort exerted in hand tapping.

The finishing tap has the same special relief and is ground on the Bath production thread grinder, correcting the lead, angle, hardening distortions and making a finished cutting tool. The tap cuts its own size and is claimed to be the only tap which will produce threaded holes in conformity with the close fit tolerances and specifications laid down by the national screw thread commission.

The taps are known as Easy Cut and are available in U. S. standard or National coarse and S. A. E., or Natnonal fine thread, standard sizes. They are also obtainable in Lowenhertz or International metric sizes and in special diameters and pitches as ordered. The action of the 60 deg. Easy Cut tap is similar to that of the Acme and for ordinary sizes the use of a roughing tap is unnecessary, the thread being cut and finished with but a single tap. Although giving unusual accuracy they are made essentially as production tools.

Lignite Producer Gas for German Open-Hearth Furnaces

Producer gas from lignite for operating open-hearth furnaces began to be used on a large scale in Germany in 1908, Rhenish lignites being used, according to an article by G. Donner in *Stahl und Eisen*, April 29, 1920. An abstract in *Technical Review*, London, gives the following information concerning this:

The most suitable form of the product is round briquettes of 65 mm. diam. and 45 mm. height. The process of normal gas production depends first and foremost on the strength of the briquettes. This condition satisfied, they have undoubted advantages in gasification as air and vapor can get unimpeded to the material and the gases produced can easily escape between the loose layers of fuel. In consequence of the hydraulic properties of the ash, care must be taken that the ashes do not remain on the grate until the cooling water comes into contact with them as otherwise the blast slits will get stopped up. Revolving grate producers of the dry type are therefore best. Water-cooled jackets are not recommended as the play of the gases round the jacket leads to the defects already mentioned. For these reasons gas producers of the type built into brickwork are the best. The added steam plays a very important part in gas production without which it is impossible to produce a satisfactory gas for open-hearth furnaces. The steam lowers the temperature in the producer and secures the formation of a hydrogen-rich gas of high calorific value. The latent heat evolved in the decomposition of the steam is recovered when the hydrogen produced burns in the furnace.

According to the writer, the gas produced from lignite is almost equal as regards calorific power and composition to that produced from coal. The following is the average composition of the lignite gas: CO_2, 3 to 5 per cent.; CO, 26 to 31 per cent.; H_2, 10 to 16 per cent.; and CH_4, 2 to 4 per cent.

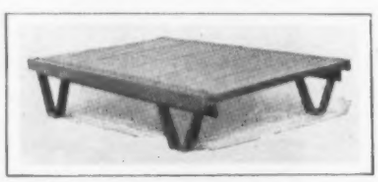
The gas is characterized by great uniformity of composition which may be attributed to the previous treatment of the lignite and the always uniform grain size. One steel works is employing lignite gas exclusively for the purpose named, 30 revolving grate producers of four different designs being in use. The charge required for a 2.6-m. diameter producer is about 15 tons in 24 hr. From the experience gained, it is not wise to increase inordinately the quantity of gas produced, as the increased blast pressure necessary carries into the producer a large quantity of dust with the result that half-burnt or entirely unburnt briquettes are found in the ash pit.

Contract for Coal Handling Machinery

SEATTLE, WASH., April 22.—The Alaska Engineering Commission has awarded the contract for coal handling machinery for the Government-owned mines of Alaska to the Brinkley Co., Seattle. The contract was awarded against competition with Eastern firms. The machinery will be manufactured at the Brinkley plant in Seattle, and is to be used for washing and grading coal from the mines, the coal to be used by the Navy and the Government railroads of Alaska. Up to this time practically all transmission machinery has come from the East, but the growth of the Brinkley plant will bring the city much nearer to the control of the machinery demand in Alaska and adjacent shipping territory. The Brinkley Co. has just completed its new plant in South Seattle which gives it an area of 10,000 sq. ft. of floor space in the machinery department alone. Transmission machinery and gray iron castings are specialties.

Steel-Bound Lift Truck Platform

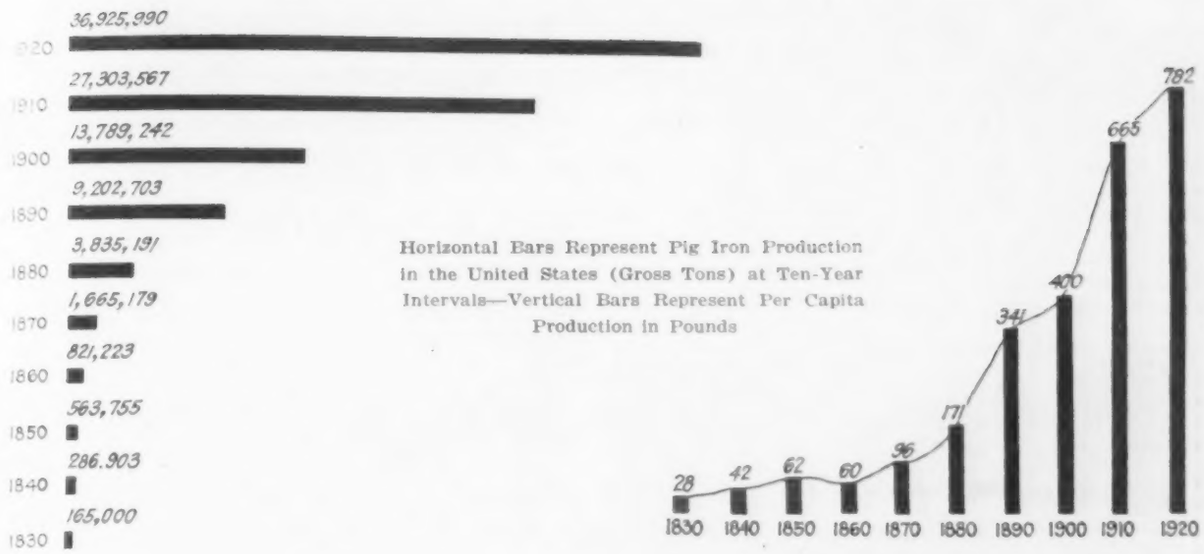
A lift truck platform with hard oak top bound by steel and supported by forged steel legs is being marketed by the Steubing Truck Co., Cincinnati. The legs are made broad faced to minimize injury to floors and have interval sufficient to ride clear of incline crowns and elevator crossings. The platform is furnished in various sizes and types including the box type, sectional bin type, stake, table and rack types.



Steel-Bound Lift Truck Platform

Building Wage Settlement in Chicago Uncertain

CHICAGO, April 23.—On the one hand the Chicago Association of Builders by a unanimous vote has decided to stop all building in this city on April 30, unless unions sign up for a 20 per cent cut in the wages of skilled labor and a 30 per cent decrease for unskilled workers, whereas the union leaders, as a counter move, have offered to come to terms with individual builders on the basis of a 10 per cent cut. In commenting on the action of the unions, E. M. Craig, head of the Association of Builders, said: "This move will do little good. Even if the individual builders accept the 10 per cent cut, our two larger associations (his organization and the Building Construction Employers' Association) will not do so and we do about 85 per cent of the construction work in Chicago. It is not our members who are keen about the cut—it is the building public."



Horizontal Bars Represent Pig Iron Production in the United States (Gross Tons) at Ten-Year Intervals—Vertical Bars Represent Per Capita Production in Pounds

Growth in Per Capita Production of Pig Iron

The Advance by Ten-Year Periods from 1830 to 1920 Inclusive, Covering a Range from 28 to 782 Pounds

BY W. S. PILLING

IN the issue of THE IRON AGE dated June 6, 1912, a chart was presented showing the production of pig iron in the United States by decades, both in tons and per capita. This chart indicated a surprising increase in production of iron per capita. The estimate of 28 lb. in 1830 gradually increased to 665 lb. per capita in 1910, an unusual increase having developed between the years of 1900 and 1910.

At the latter date it seemed to be quite questionable whether this per capita increase would be continued, and in the opinion of the writer this doubt was well founded.

The substitution of reinforced concrete in the construction of large buildings, bridges and other structures, seemed to threaten the consumption of iron and steel; but subsequent developments have proved that notwithstanding this competition the production of iron has increased, not only in tons but also per capita.

The accompanying chart indicates the increased rate of production, which in 1920 amounted to 782 lb. If the chart had been drawn to include each year, instead of ten-year periods, the line of advance would have been irregular and erratic. The iron business, like many other industries in the United States, is either unduly depressed or inflated by temporary conditions, so that the line of advance, if accurately drawn, would have shown numerous temporary depressions.

It is, however, a fact that the history of the industry for the past century has demonstrated a strong upward tendency in both tonnage and per capita production, and at the present writing there are no sufficient grounds to indicate that the advance will not be continued, even if at a diminished rate. Thoughtful minds are considering whether the recent or even the present rate of exports can be maintained, and it must be borne in mind that the chart represents not the domestic consumption, but the total production of the United States, and that these figures have recently been swollen by heavy exports, which at the present time are not being maintained.

There are many indications that competition from other iron producing countries will be keen, and perhaps will permanently affect the exports from the United States.

Alloy Used in Zeppelins Not Secret

Reports were printed in the daily press in this country and Europe recently that some American scientists had discovered the composition of the light alloy used by the Germans in the construction of their Zeppelins. The London *Ironmonger*, commenting on these statements, says, after characterizing them as "amusing":

> The word used in the newspaper reports was not composition but "formula"—a vague term which might mean almost anything or nothing; but if the American scientists do mean that they have found out the composition of the German alloy they are some years late in claiming it as a discovery. Our National Physical Laboratory has known this alloy for two or three years. More recently certain difficulties connected with the hardening and working of these and other aluminum alloys, which at first were not understood, have been satisfactorily overcome. The Zeppelin alloy, which was used for the framework of the airships, is one of a series of copper-aluminum alloys containing small proportions of magnesium and manganese which, after suitable heat treatment, have been found to possess remarkable strength and ductility resembling mild steel in many respects but which are, of course, very much lighter. There has never been any attempt to make a secret of the developments which have taken place in the investigation of the aluminum alloys in this country and therefore it is difficult to believe that the officials of the Navy Yard at Philadelphia take this belated discovery seriously.

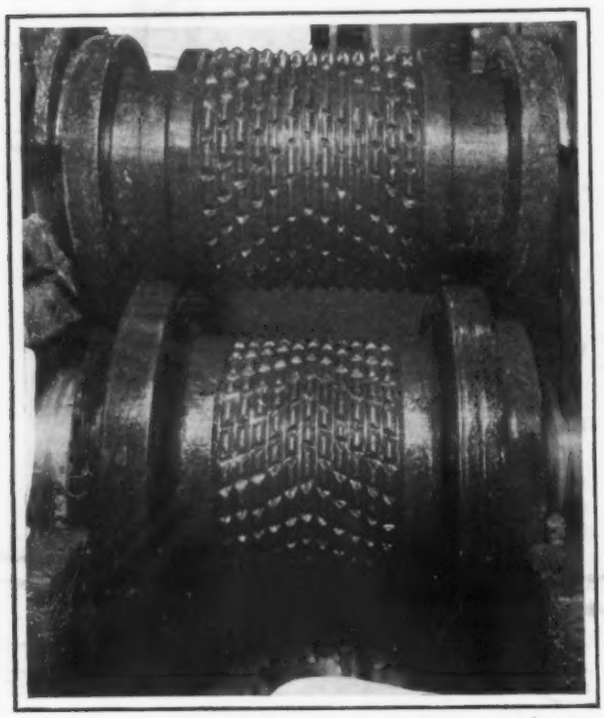
Charges Declared Unjust

WASHINGTON, April 26.—Examiner Brownson Jewell of the Interstate Commerce Commisison in a tentative report in the case of the Oliver Iron & Steel Co. against the Pittsburgh & Lake Erie Railroad, et al., recommended a holding that the refusal of the trunk lines to compensate the complaintant for the expenses of terminal switching to and from its plant at Pittsburgh, between Feb. 7, 1916 and May 31, 1917, resulted in the exaction of charges which were unjust and unreasonable and to have subjected the iron and steel company to undue prejudice. The examiner also recommended an award of reparation. He made no effort to approximate how much would be due if his recommendation were approved.

Rolls for Spellerizing Steel

Spellerized pipe differs from ordinary steel pipe in that its manufacture includes a spellerizing process intended to give the metal a more uniformly dense texture and decrease the tendency to pit and corrode.

The process is employed by the National Tube Co. and consists in subjecting the heated bloom to the action of rolls having regularly shaped projections on their working surfaces. Then, while still hot, the bloom is subjected to the action of smooth-faced rolls and the operation is repeated, whereby the surface of the metal is worked to produce a condition calculated to resist corrosion, especially in the form of pitting. This process is applicable to the smaller sizes of pipe, 4 in. and under, although it is possible in special cases to spellerize pipe a few inches larger.



Rolls Used in the Spellerizing Process. After being subjected to this operation the bloom is passed while hot to a set of smooth faced rolls

Using a homely comparison, the process of spellerizing metal may be considered analogous to the kneading of dough from which bread is made. Dough is kneaded to produce a smooth, uniform texture; to facilitate the escape of confined gases which would form air holes and other irregularities in substance and on the surface, and to make an even grain and a smooth surface. Much the same results are obtained by spellerizing the steel bloom. A uniformly dense texture supplementing the general uniformity of carefully prepared metal reduces the tendency of galvanic action—which is commonly regarded as the origin of corrosion.

Frozen Ore Case Decided

WASHINGTON, April 26.—Of great interest and importance to the iron and steel industry is a decision handed down last Thursday by the Interstate Commerce Commission, holding that it is not always necessary for a consignee to give written notice that a lading of iron ore is frozen and could not, therefore, be unloaded within the free time to enable a shipper to avoid demurrage on such traffic. The opinion related to the case of the Virginia Iron, Coal & Coke Co. against the Norfolk & Western and the Director General. Commissioner Hall dissented, maintaining that the decision should have followed the rule approved by the Supreme Court in the case of the Pennsylvania Railroad Co. against the Kittanning Iron & Steel Co., and the rule laid down by the commission in the case of the Wharton Steel Co. against the Director General.

In this connection, the commission held that the imposition of $2 807 for demurrage on frozen ore at Roanoke, Va., received during the period of December, 1917-January, 1918, was unreasonable and ordered reparation of the full amount with interest. This decision is expected to establish a precedent for similar cases that are pending before the commission, and one that frequently has been a point of contention between the iron and steel trade and the railroads.

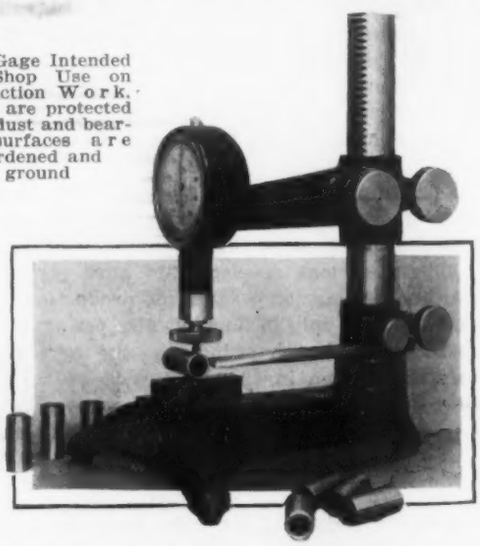
Will Hear Ore Rate Complaint

WASHINGTON, April 26.—The Interstate Commerce Commission has assigned May 31, as the date for the hearing to be held at the Great Northern Hotel, Chicago, in connection with the complaints of the Lake Superior Iron Ore Association against rates from the upper mines to the upper ports. The case has been consolidated so as to include the protest filed last December against the then existing rates, and the complaints against the subsequent increases made in rates from mines on the old ranges. While it was originally expected that the case would be heard by Examiner Nackley, it has been definitely assigned to Examiner Money.

New Dial Gage

For the quick and accurate gaging of bushings, shafts, plates and almost everything that is now checked by micrometers, the B. C. Ames Co., Waltham, Mass., has added to its line of dial gages the dial comparator shown. It is intended for shop use on production work as well as for service in the inspection department.

The dial of the gage is 1⅞ in. in diameter and is marked in 0.0005 in. Readings of 0.00025 in. can be easily made and variations of less than 0.00025 in. can be readily detected, as the figures are black against a white background. The gaging is controlled by springs, showing the errors plus or minus instantly and without the uncertain personal element in "feeling" mics, so called in shop parlance.



Dial Gage Intended for Shop Use on Production Work. Parts are protected from dust and bearing surfaces are hardened and ground

In using the gage the outer clamp is loosened and the arm supporting the dial is moved up or down by the knurled nut next to the clamp. The clamp is then tightened and the hand of the gage brought to zero by turning the knurled screw directly underneath the dial. The gage has a travel of ¼ in., so that although if set to a 0.500 in. standard it will measure from 0.500 to 0.750 in., a feature that makes the gage useful on shafts, bushings and other work of more than one diameter.

A stop is furnished against which work may be revolved to detect out of roundness. Two anvils are provided; one, plain ½ x 2 in., another, scored 2 x 2 in. The gage stands 10½ in. high and weighs 10 lb.

The Youngstown Structural Steel Co. has purchased an 11-acre site at Youngstown, Ohio, on which it expects eventually to erect a steel fabricating plant.

IDLE PLANT FACILITIES

Meeting Discusses Separating Expense of Idleness From Manufacturing Cost

A diagnosis of idle plant facilities and the methods of reflecting the expense of the idleness in such a manner as to bring it under control was the subject of a joint paper by T. W. Dinlocker, assistant comptroller, S K F industries, Inc., New York, and A. W. Wainwright, works auditor, S K F Ball Bearing Co., Hartford, read and discussed at a meeting of the New York section of the Industrial Cost Association, held at the Bush Terminal Sales Building, New York, April 21.

Idleness was classified as normal or controllable and abnormal or uncontrollable. Of the normal, idleness chargeable to the management comprised excess facilities, unequalized facilities, obsolete facilities and shortage of raw materials. Idleness due to the employees comprised lateness, absence, waiting for materials, tools, set up, etc. Abnormal idleness, due to outside influences, comprised business depression, strikes and labor and material shortage.

Using this classification as a basis, it was developed that it might be profitable from the standpoint of management to charge manufacturing costs with the expense incident to controllable idleness and to relieve manufacturing costs for the expenses incident to uncontrollable idleness. The authors expressed the opinion that the expense of idle facilities is not entirely a proper part of manufacturing cost and in support of their contention offered the following reasons:

1—True costs are especially helpful during periods of depression when business requires careful administration. Absorbing the expense of idleness in manufacturing results in widely fluctuating costs, and consequently the management is without the aid of cost records in determining comprehensive manufacturing and selling policies.

2—Effect on manufacturing management: To include the expense of idleness in costs would prevent the use of cost records for the purpose of comparing present performances with those of periods in which idleness did not exist. For instance, the output per unit might be higher but the increased cost might indicate that it was lower.

3—Effect on financial management: In cases where the product is shipped as soon as made no difference in the net profit is shown whether the expense of idle facilities is absorbed in manufacturing cost or treated elsewhere in the accounts. On the other hand, if the product is not promptly shipped and the tendency is to increase inventories, it will be found that undue inflation of inventories and profits follow. In later periods, when the product commences to move, profits appear to be much less on account of the inflation in cost. This is due to the fact that the profit had actually been anticipated at the end of the previous year through the inclusion in inventories of idle facilities burden.

4—Effect on sales management: When selling prices are based on cost, the inclusion of idle facilities burden would force selling prices so high as to prevent the securing of new business at a time when needed most. Sales policies may be outlined in a more definite manner if the expense of idle facilities were known as a separate factor.

The mere transferring of idle facilities expense from manufacturing cost does not abolish it, and as such it must be borne in mind when outlining sales policies and prices. Knowing the extent of the expense of idle facilities as a separate factor would enable the managment to determine the following: (a) The amount necessary to increase normal selling prices to provide more profit to be used as an offset to idle facilities expense; (b) When competitive or other conditions prevent increase in price the volume of sales necessary to increase volume of production consequently eliminating idle facilities expense.

It was pointed out that whether or not the expense of abnormal idleness is to be absorbed into cost or charged elsewhere is a matter for the management to decide. The intention of the paper was to show some of the points upon which this decision may be based. It was suggested, however, that in any event provision should be made for collecting the expense of such idleness as a separate element of costs.

An outline of several methods of computing and applying the expense of idle facilities was reviewed and the possible methods of reflection in the accounts were enumerated as follows: (1) Inclusion of normal and abnormal idleness in cost of manufacture. (2) Inclusion of normal idleness only in cost of manufacture, and disposing of abnormal idleness in one of the following manners, charging direct to current profit and loss statement; charging direct to surplus account; charging direct to reserve for idle facilities or contingencies.

Attributes of Management

Functional organization and management was the subject considered by the New York Section of the Taylor Society at the Flatiron Building restaurant, New York, Thursday evening, April 21. The chief speaker was Henry W. Shelton, who had gained experience in his subject as assistant professor of organization and management at the Amos Tuck School of Administration and Finance, Dartmouth College; as head of the personnel section on the staff of the vice-president in charge of administration in the Emergency Fleet Corporation, and as consulting engineer in charge of the reorganization work at the Wilmer-Atkinson Co., Philadelphia.

Industry may be likened to an equilateral triangle, the speaker declared, one side being represented by thinking; the second, by feeling, and the third, by doing. In the past we have not known how to organize the feeling side of industry. In its first stage we had an unorganized, decentralized activity. We have now reached the second stage, where production is organized and centralized. And we are just getting into a third stage where particular functions are recognized and are being redistributed among individuals in a sensible way—in other words an organized, decentralized activity. Part of what he said is in substance as follows:

Authority must rest on knowledge of fitness—no longer on "dignity" of position. Don't keep hard and fast to any one group of standards. Keep reanalyzing and changing them as new personnel bring to the task greater or less powers. Open mindedness to criticism is very essential. Every workman should be an inspector. Publicity is a great factor for promoting harmony.

Scrap Dealers' Complaint Dismissed

WASHINGTON, April 26.—The Interstate Commerce Commission has dismissed the complaint of Briggs & Turivas of Chicago against the Pennsylvania and other railroads, holding that the minimum of 56,000 lb. on steel turnings, maintained by the railroads east of the Buffalo-Pittsburgh line, is not unreasonable or unduly prejudicial, notwithstanding the fact that the railroads in the territory West of the Buffalo-Pittsburgh line to the Mississippi river maintain a minimum of 48,800 lb. not only on turnings but also on scrap iron and steel with which the steel turnings must compete. It reiterated what it has said in prior cases that because one place has a higher minimum than another the showing is not necessarily of undue prejudice.

Mining Companies Benefited

DULUTH, April 25.—The Minnesota bill limiting tax expenditures of municipalities passed April 20 will save mining companies more in taxes than the recent occupational tax assesses them and by several million dollars a year. No municipality can hereafter expend more than $160 per capita annually for local school purposes. Hibbing did spend $222 and Buhl $557.

F. J. Ryan & Co., Franklin Trust Building, Philadelphia, have just completed the installation of a large electric processing and solvent recovery equipment for the Thermoid Rubber Co., Trenton, N. J., and an electrically heated belting table for the Victor Balata & Textile Belting Co., Easton, Pa. The fuel burning department, which has recently been added to this organization, announces the following installations: One large annealing oven, Mare Island Navy Yard, Cal.; one double chamber forging furnace, Naval Airship Construction, Lakehurst, N. J.; five pit annealing furnaces, one non-ferrous annealing furnace, two drying ovens, Bridgeport Screw Co., Bridgeport, Conn.

Metal Trades Annual Convention

Present Business Depression Calmly Considered

Belief Expressed That the Worst of After War Troubles Has Passed—Principle of the Open Shop Strengthened—Secretary Sayre Warns Against Policy of Retaliation—Industrial Education Making Progress — President Newton and Other Officers Re-Elected

THE National Metal Trades Association, at its twenty-third annual convention at the Hotel Astor, New York, last week directed its attention largely to discussions of the present business depression, the outlook for the future, both at home and abroad, and the best ways to meet the readjustment in industrial conditions, particularly with reference to hours and wages. The association declared its belief that the soundness of the principle of the open shop has been greatly strengthened by the events of the past few years in the labor world.

Sentiment among the manufacturers in attendance, who represented 20 or more branches of the metal-working industry, from automobile to machine tools, indicated a belief that the worst of the business depression is over, but there was much doubt whether a substantial business recovery will take place this year. At best, it was thought, there will be a gradual resumption of activity, with conditions approaching normal some time late this year or early in 1922.

Copies of a tabulation of replies to a questionnaire sent to members of the association on April 4 were presented to members. A recapitulation of the answers showed the following results:

What change in your working hours during the past year? No change, 247; 1 to 20 per cent less, 124; 21 to 40 per cent less, 90; 41 to 100 per cent less, 38.

How do your present working hours compare with those of Jan. 1, 1921? Increased, 28; no change, 283; decreased, 176.

How does your present working force compare with that of one year ago? Increased, 23; no change, 58; decreased, 407.

How does your present working force compare with that of Jan. 1, 1921? Increased, 58; no change, 138; decreased, 276.

How do your present hourly rates compare with those of one year ago? Increased, 54; no change, 163; decreased, 259.

How do your present hourly rates compare with those of Jan. 1, 1921? Increased, 2; no change, 276; decreased, 207.

Replies were received from the following industries: Automotive vehicles, automobile accessories, boilers and sheet metal products, builders' supplies, castings and forgings, construction, engineering and repairing, electrical apparatus, engines and accessories, furniture, hardware, instruments and scientific equipment, machine-shop equipment, machinery, manufacturing.

Old Officers Re-elected

President Albert E. Newton and other principal officers of the association were re-elected. Three new names were added to the Administrative Council and Justus H. Schwacke of William Sellers & Co., Philadelphia, was by acclamation made an honorary member of the council. The names and business connections of the officers and councillors follow:

President, A. E. Newton, Hobbs Mfg. Co., Worcester, Mass.

First Vice-President, George O. Rockwood, The Rockwood Mfg. Co., Indianapolis, Ind.

Second Vice-President, W. W. Coleman, Bucyrus Co., Milwaukee, Wis.

Treasurer, F. C. Caldwell, H. W. Caldwell & Son Co., Chicago.

Councillors for Two Years: L. J. Chandler, Chandler Co., Springfield, Mass.; A. C. Gilbert, The A. C. Gilbert Co., New Haven, Conn.; G. W. Mixter, Pierce-Arrow Motor Car Co., Buffalo; Paul C. DeWolf, Brown & Sharpe Mfg. Co., Providence, R. I.; Paul T. Norton, Case Crane & Engineering Co., Columbus, Ohio; M. B. McLauthlin, Geo. T. McLauthlin Co., Boston.

Councillor to fill unexpired term of D. M. Wright, E. J. Miller, St. Louis Screw Co., St. Louis.

President Newton's Address

In his opening address, President Newton contrasted business conditions as they were at the time of the 1920 convention and now. "A year ago," he said, "we had more unfilled orders for our goods than we could find materials and labor with which to produce them; to-day most of us have materials a-plenty and labor is available everywhere, but orders are few and difficult to obtain.

"No one can tell," he said, "how long this depression will continue. Recent events, however, encourage us to believe that we have passed the worst part and are on the road to recovery. The lowering of commodity prices has resulted in a reduction in the cost of living. The figures compiled by the National Industrial Conference Board show a reduction from the high point of July, 1920, which was 104 per cent above 1914, to 65 per cent above 1914 in April of this year—a reduction of 37½ per cent.

"It is inevitable that the abnormally high wages which have recently prevailed must recede before we can expect to return to a normal basis, and consequently reductions in wages have already taken place in many industries and more will undoubtedly follow. In those industries where decreases in wages have been made, a greatly reduced production cost will be realized when normal business is resumed. There is also a changed attitude on the part of the employees and a general resumption of reasonable shop discipline, the production per employee per hour being, no doubt, greater than it has been for the past two or three years. This will also have a great effect in the further reduction of costs.

"Most of our industries are free, as they should be, to act as existing conditions of supply and demand require, but one of our greatest—that of railroad transportation—is literally bound hand and foot. It has for years been regulated as to its charge for service, and since the Government tried its hand at operating the railroads, they have been compelled to pay wage rates under conditions as specified by the Railroad Labor Board, appointed by the President of the United States, and in accordance with rules made by this board, attempting to classify the different occupations nationally.

The Recent Decision

"The recent decision on the part of this board, to allow the various railroad managements to deal directly and make agreements with their own men, may result in little or much, depending upon the attitude of the board, as the agreements between the railroad executives and their men are being worked out, but in any event it indicates a loosening of the cords in response to the increasing demand of a public opinion that has had enough of high prices, caused by a labor monopoly. So we can be hopeful that some day the railroad executives will be allowed to manage their roads, for the operation of which they are responsible. I believe that the sooner all employers resume full control of the management of all departments of their

F. C. Caldwell
Treasurer

G. W. Mixter
Councilor

A. E. Newton
President

Paul C. DeWolf
Councilor

A. C. Gilbert
Councilor

Some of the Officers and Councilors of the National Metal Trades Association

business, readjust prices and wages to a level not abnormally high, nor too low, and see to it that a reasonable day's work is obtained from each employee, the sooner we shall resume normal business conditions.

"For 23 years the National Metal Trades Association has stood firmly in opposition to closed union shop conditions. During that period, there have been times when many people throughout this country thought we were very much out of style and out of touch with the spirit of progress. During the war there were times when it required unusual courage on the part of our members to maintain our principles, in the face of governmental boards and department heads, who, to say the least, were friendly toward those who were missing no opportunity to force union shop conditions in all industries. The outcome to date proves that our contentions were, and still are correct.

Failure of the Federation

"The pendulum is swinging back. It started some time ago. This became very evident when, last November, the leaders of the American Federation of Labor were unable to elect the candidates they stood for, or to defeat others to whom they were opposed. Apparently, the present Administration will not stand for class privilege, class exemption from general laws, or class legislation. President Harding emphasized this in his inaugural address, when he said: 'Our fundamental law recognizes no class, no group, no section. There must be none in legislation or administration.'

"Class exemption from general law was given a knockout blow by the United States Supreme Court, in its decision in the Duplex Printing Press case, when it also told organized labor that secondary boycotts are illegal.

"Thousands of employers throughout the country have declared themselves against the closed union shop, and conditions which they feel were forced upon them during the past few years. Many of them have decided to lengthen the basic week to a 50, 54, or 55-hr. basis, being convinced that a shorter week is uneconomic and that to work a longer week, paying overtime for all hours over the 44 or 48-hr. week, is merely another method of increasing wages, which should be taken care of in the regular rate per hour. Under present business conditions, however, many are only operating their plants part time.

The Cincinnati Strike

"On April 29 of last year, a general strike was declared in Cincinnati, by the International Association of Machinists, affecting some 100 companies, most of them members of our association. This strike lasted until Sept. 15, when it was unconditionally declared off by the machinists' union, resulting in a complete victory for our members, all of whom stood firm in opposition to the closed union shop. This attack on the Cincinnati shops by the International Association of Machinists was, by far, the greatest attempt ever made by that organization to unionize and control any large metal trades center. In attacking these shops, the International Association of Machinists marshalled all of its forces, both local and national, but went down in defeat, pitted against our association. The outcome of this struggle again demonstrated the great value of our National organization. Our entire membership looked upon this strike as one in which they were personally interested in combating, and when called upon to contribute toward the defense of our members who were standing the brunt of the attack, the only remarks made, were those of encouragement to our Cincinnati members.

"I cannot speak too highly of the conduct of the defense of this strike, on the part of the officers and members of our Cincinnati branch, also our commissioner and secretary, together with their staff.

"The association as a whole and its national officers in particular, have suffered an irreparable loss during the past twelve months in the deaths of D. M. Wright, councilor, of Hartford; B. F. Tobin of Detroit, a former councilor, and one of our past presidents, William H. Van Dervoort of Moline, Ill. Three great characters have gone. Their places among us cannot be filled. We may only close up the ranks and move forward strengthened and stimulated for our future duties by the memory of the words, works and lives of these three true and tried advisers."

Memorial to W. H. Van Dervoort

A memorial resolution relating to the death of William H. Van Dervoort, former president of the association, was adopted as follows:

We are called upon to make formal record of the death of Mr. William H. Van Dervoort, on the twenty-fifth day of February, 1921.

In making this record, we do so not only with a sense of great loss to the National Metal Trades Association, but with deeply felt and keen consciousness that there has gone from us a close personal friend.

While we thus give official recognition of the loss of one of the most useful and strongest members of the association, there is intermingled with this a personal feeling of love and esteem which was shared by all of our membership that came in contact with him.

Mr. Van Dervoort's services for the association and its collateral activities began with his election to the Administrative Council in 1911. His faithfulness to his duties, as a councilor, his constant attendance upon meetings, his keen interest in the welfare of the association, and his energetic participation in all the activities of the association immediately impressed upon our membership the fact that in him we had found a strong champion and able advocate of the

principles of the association. It followed naturally that he should become successively a member of the Executive Committee and president of the association. His service as president of the association for two terms fell in the critical and troublous years of 1916-1918. War conditions placed upon him not only the tremendous burden of operating the plant of his own company, engaged in production of materials vital to the prosecution of the war, but the difficulties which confronted our association at that time were manifold and of the gravest importance to the membership of the association, and, indeed, to the successful prosecution of the war.

Growing out of this official work was Mr. Van Dervoort's connection with the National Industrial Conference Board, as the representative of our association, and with the War Labor Board as a leading member of the employers' group.

Strong man as he was, these numerous and engrossing activities, daily demanding the solution of novel and perplexing problems, placed upon him a strain which might well be likened to actual combat under the terriffic conditions of the battle fields of the World War.

We may truly record that the life of William H. Van Dervoort was given to his country, as certainly as that of any other patriot in her service.

Strong and wise man, able counselor, tireless and efficient official, good friend and genial companion, we shall seldom look upon his like again, and this tribute, heartfelt as it is, can but poorly set forth the honor and esteem with which we regarded him.

It is resolved that a minute of this record be spread upon the proceedings of the association, and a copy, properly engrossed, be forwarded to the family of Mr. Van Dervoort.

Secretary Sayre's Report

In his annual report Secretary Homer D. Sayre of Chicago said there had been a substantial gain in membership during the past year, a net increase of 46, making the present total of members 1113. Ten applications for membership are pending. There are 23 branch associations, Milwaukee and Philadelphia having formed local associations during the past year.

On the question of hours and wages, now uppermost in the minds of most of the members, Mr. Sayre reported as follows:

"While there has been no national, concerted movement towards lengthening the weekly working schedule, a number of employers have decreased their hourly rates and have increased their weekly schedule, so that their employees are now receiving the same wage per week on the longer schedule as they formerly received under the shorter one. In other instances, the employers have simply eliminated overtime work with the consequent abolishment of overtime rates. In many other cases the weekly working schedule has been still further reduced. Almost immediately when the business depression overtook us, it became necessary to reduce working forces, and the less efficient and undesirable workers were laid off. In many cases it was found that practically the same amount of production was maintained with this reduced force. Later many concerns found that it would be necessary to go even further and, accordingly, instituted a general reduction in wages. Investigation among the shops of our members shows that horizontal decreases have been the exception rather than the rule, the general practice being to make individual decreases based upon such considerations as efficiency, productivity, loyalty and length of service. In this connection I should like to emphasize the fact that our association is absolutely opposed to a horizontal increase in wages, and for similar reasons should be equally opposed to a horizontal decrease.

"Probably nothing would have a greater tendency to prolong industrial uncertainty than for employers to take advantage of present conditions and to retaliate for those things which were forced upon them during the war period and which were in so many cases dictatorial and unjust. Now is the time when wise and considerate courses of action will go a long way toward the re-establishment of more cordial and frank relations."

Commissioner Hibbard's Report

Commissioner John D. Hibbard's report, according to custom, dealt with the active functions of the association in the handling of labor disputes. He said:

"Perhaps the most important development of the year was the very widespread movement toward the open shop or, as it is often called, the American plan. We believe that this spontaneous expression of disapproval of organized labor's coercive closed shop policy, far from being the result of a conspiracy of Wall Street, big business, employers' associations, and of those who would crush unionism, as Mr. Gompers would have you believe, was and is a natural reaction from the autocratic, unbearable and unAmerican methods and practices of union labor, as these must be judged by history.

"You are all more or less familiar with the story of the progress of this movement; the number of towns and cities which, through their boards of trades, chambers of commerce and citizens' organizations, have adopted American plan resolutions; the widespread interest in them manifested by citizens of all walks in life. Perhaps there is no very clear or universal idea as to just what the open shop is or should be and in many instances, no doubt, after passing resolutions, the average citizen will believe that his duty has ended there. Nevertheless the all-important thing is that there is a growing opposition to union policies and practices which will compel in the near future a new order of things. We further believe with a knowledge of this growing public sentiment; and as a result of recent investigations and of the inroads made upon their ranks by industrial unionism, leaders of organized labor have come to realize that radical changes must be made and signs are not wanting that the old order is passing away, for what, we do not as yet know.

Strike Cases

"For the four months following our last convention, or until about Sept. 1, conditions as regards strikes and unrest continued about as they had been for the preceding two years or more. Practically no new strikes were called in the shops of any of our members after Sept. 1, and but two minor matters are now receiving attention. It is true that the Cincinnati case and some others were not finally closed until after that date.

"The all-important strike of the year, involving as it did so many crucial issues and taxing the resources of both your own association and those of the International Association of Machinists, was that which began during the sessions of our last convention and lasted until the middle of September, at Cincinnati.

"Your general officer endeavored to keep the membership posted as to the general progress of the strike, but at no time was there the slightest doubt of the final outcome, either in the minds of your officers or in those of our Cincinnati members who so bravely bore the brunt of the attack. Just to refresh your memory and for the sake of our records, allow me to remind you that:

"There was no question as to the issue. In the Commissioner's Bulletin of June 7, 1920, attention was called to the inspired news item, sent out from Washington, that the International Association of Machinists was raising $4,200,000 by assessing its 350,000 members $1 per month, to fight employers' associations. Cincinnati was to be made a closed shop town in the metal trades industries. That was the issue.

"No strike in the history of your association was of such vital importance and none involved so many members or employees. Sixty-eight concerns (49 our members) were affected—from a few employers to the entire operative force. Some 7000 operatives quit work, and it was claimed that 10,000 to 12,000 had joined the union.

"Every effort was exerted by the International Association to hold the men out and in line, as the strike continued long beyond the expectation of the local officers, and international officers and organizers as well as representatives of the American Federation of Labor were frequently called to Cincinnati to lend their assistance. Probably more financial support was given the local men than in any other similar machinists' strike.

"The loyalty of our Cincinnati members, the devotion and good judgment of their Executive Committee and of their officers and the practical assistance rendered by the National Association in both men for the struck shops and financial aid, combined to win a 100 per cent victory. The open shop remains in Cincinnati and in

our industry after the most vicious attack which the International Association of Machinists was able to bring about.

"You will doubtless be interested in what it cost 'the other fellow.' The following is taken from a report of Organizer Knudsen, in the *Machinists' Journal* for April, 1921:

Often it is enlightening to know the cost of a strike. In Cincinnati enough money was spent to buy a small industry, as follows:

Grand Lodge strike benefits	$148,863.00
Local assessments	30,013.50
Donations from sister lodges and outsiders	11,148.93
Amount spent out of lodge No. 162 treasury	28,298.40
Total	$218,323.83

The above amount was paid direct to the strikers. Many other bills were paid which amounted to nearly $20,000, and the Grand Lodge maintained in Cincinnati a Grand Lodge auditor and organizer for almost a year.

The Grand Lodge share of the strike benefits, $148,863, represents a per capita tax of 248,105 members.

In Cincinnati the men have received more money and benefits than they will ever pay into the organization if they live to the age of 150 years. There was spent in Cincinnati almost 10 per cent of our entire income.

Industrial Education

Progress in industrial education during the year was reported by Harold C. Smith, Illinois Tool Works, Chicago, chairman of the committee having that work in charge. Mr. Smith stated that Philip C. Molter, superintendent of the industrial training work, had worked in eight districts and visited 130 plants during the year. A greater number of companies have installed definite training methods for foremen and apprentices, while a great many more have signified their intention of doing so as soon as conditions warrant. The committee's report in part was as follows:

"During the past year there has been a renewed interest in apprenticeship for the development of all-round workmen. Apprenticeship is particularly designed to take care of young men who wish to learn a trade in all its branches, but is not generally adaptable to the instruction and upgrading of unskilled workers. The committee feels that while there has been a lessening interest in apprenticeship as a result of conditions brought about by the war, yet this is also due in a large measure to the unattractive conditions of the indentures.

"There has also been a rapid growth of training courses for foremen. These courses are being given by the universities both within their own premises and by extension workers in plants; also by field men representing the Federal Board for Vocational Education; by local school boards as extension work under the Smith-Hughes law; by plant leaders within the larger shops; by the correspondence schools and by other agencies. Some of our members report very satisfactory results from these courses, and the committee wishes to call attention to the possibilities of this form of training.

"Compulsory attendance at continuation schools by permit workers has also made rapid strides, 25 states now having legislation making education and training for these young people mandatory.

"As a result of its studies during the year, the committee finds the following conditions to exist:

1. There is a shortage of efficient workers for normal production.
2. Too few companies train workers.
3. Many of those who do attempt to train have nothing even approximating a definite schedule for this work, and have not definitely determined responsibility for instruction and training as part of the duties of some person or group.
4. Very few foremen are able to give proper instructions to a training necessary.
5. Conditions within the various plants determine the type of training necessary.

In view of these findings, the committee has two specific recommendations to offer, namely:

Recommendations

1. That a definite number of specialists or apprentices be trained in each shop; this number to be proportionate to the total number employed.
2. That a committee on industrial education and training be formed in each branch. Such committee to co-operate with local educational or training institutions on questions pertaining to technical, vocational, part-time and continuation schools, and to consider ways and means of furthering training and education within the plants of our members.

The committee is of the unanimous opinion that training in industry is vital, and that every member should do something in this respect. It appreciates, however, that it is perhaps impossible for some of our members to actively take up this work at the present time. On the other hand, this perhaps would be the most favorable time for others to make a start.

Leaving School Early

Among our reasons for believing that industry must assume much of the task of education, is the fact that a great number of our young people leave school at the earliest permit age to go to work. We will not discuss this phenomenon or the reasons for its existence, but merely state the facts as shown in the 1917 report of the Commissioner of Education, which shows that out of a total school population between the ages of 10 and 14, 9,939,532 in number, only 145,891 or 1.47 per cent are not in school, while in the next group ranging from 15 to 17 years of age, 5,823,160 in number, 2,463,458 or 42.3 per cent are not in school. The next group ranging from 18 to 20 years of age, shows 82.87 per cent out, and of those from 21 to 24, 95.17 per cent no longer attend any sort of school.

Another table in this same report shows that the group which started school in the first grade in 1906 dropped from 4,066,091 at that time to 1,244,098 in the eighth grade, and of these only 629,432 entered high school in 1914-15, and it estimates that only 117 out of each 1000 entering the first grade in 1906-7 would graduate from the high school in 1918. Need we elaborate on this condition to show that we have a duty to perform?

Plant Conditions Differ

"While the individual members of the committee have some preference for certain particular forms or systems of training for their own plants, the committee as a whole has not reached the point where it recommends any particular system of training as being applicable to each individual plant, and it is unlikely to do so, in view of the size of our membership, and the great variety of products manufactured. In the opinion of the committee each plant should be considered on its own basis, having a careful regard for the number of workers employed, character of the product, skill required and local conditions.

"It is the belief of the committee that in a majority of instances shops with 100 or more employees should consider seriously the establishing of a training department. In the smaller shops the quota could be trained in connection with the tool room or some special department. Each plant should have some individual in charge of and responsible for training.

"Because of the fact that the association has but one field man to serve 1000 members, the committee is of the opinion that the second recommendation—that of appointing branch committees—is very important in order to secure the necessary co-operation to do justice to this work. It is the sincere hope of this committee that the time is not far distant when these local committees, if appointed, will so thoroughly appreciate the necessity for this work as to employ a salaried expert for the sole purpose of carrying out their plans. The benefits from this work, supervised by the local executive committee, and under the general direction of the National Committee on Industrial Education, would be immeasurable and would more than justify the expense, which if spread over the branch membership, should not prove burdensome. You will remember that this same thought was expressed by the committee last year, and we again wish to emphasize it at this time. At least two branches have contemplated this step, and have called on the field men for advice and suggestions regarding the matter.

Activities of the Department

"It may be that some members are not familiar

with this phase of the association's work, therefore the Committee on Industrial Education wishes to point out that the specific activities of this department are as follows:

"1. Assistance of an advisory nature is given to determine through studies and surveys the form of training best adapted to any individual plant.

"2. Constructive criticism is given to those having training methods in operation. When a member asks for either of these services, the field man will come to the plant and make a study or survey of all the conditions which have a bearing on the subject, and after this is completed formal recommendations will be offered regarding the method or combination of methods which, in the opinion of the field man, are best adapted to the plant. These recommendations carry no obligation, but may be accepted or rejected as the judgment of the management dictates. Should they be accepted, or should an alternative scheme be put into effect, the committee will be glad to give any advice or assistance necessary to insure the successful installation of the training method.

"3. This department acts as a clearing house for trained instructors and directors of education and training for those who do not care to develop their own, although it recommends that they be chosen from among the regular force wherever it is possible to do so.

"4. The department keeps in touch with the developments in vocational and technical education and with legislation bearing on these subjects, and invites discussion regarding them from interested members.

"5. The committee issues short bulletins from time to time for the purpose of calling attention among the membership to the great need for intelligent instruction of workers."

European Conditions

One of the most important addresses before the convention was that of William S. Kies of Aldred & Co., bankers, New York. Mr. Kies talked chiefly of European conditions, his observations being the results of visits in the principal countries several months ago, supplemented by correspondence, which has enabled him to follow later developments. He was strongly of the opinion that Europe is the key to the present economic, financial and industrial situation.

"We have so much to read and hear so much about the present complex situation," said Mr. Kies, "that we have become confused and perplexed. A year ago, in the height of our prosperity, some men told us that fundamental conditions were not sound and that such prosperity could not last. We now wonder why all of us did not see what a few saw so clearly."

Mr. Kies traced the growth of the United States industrially and stated that in 1913 the capacity of our manufacturing plants was 25 per cent in excess of the domestic consumptive demand. We began then, he said, to look to foreign markets to absorb our surplus. While we were still studying foreign trade the war came and the demand for our products taxed our productive resources and caused a still further expansion in plant facilities. The result to-day, Mr. Kies pointed out, is a productive capacity fully 30 to 35 per cent in excess of the normal requirements of our own people. This excess manufacturing capacity is the first factor in the present situation, the speaker said, and brings us to a consideration of ways and means of disposing of our surplus abroad.

What kind of a market can we expect? What kind of competition can we expect in the markets of the world and what European competition can we expect here at home? These are questions that must be solved in the new era of foreign trade relationships.

Before the war, said Mr. Kies, Europe was our largest customer. Germany, alone, took a considerable part of our grain, cotton and copper. Now Germany and the other countries of Central Europe are taking very little of our goods, because they haven't the money to pay for them. The vast majority of people in the Central European countries are too poor, he said, to buy the ordinary necessities of life—food and clothing. In South America our goods are being refused and are lying on the docks. South America, Mr. Kies explained, is in the position the United States was in 50 years ago—it needs outside capital for development. As our growth and development for many years was largely financed by European capital, so now the South American countries require the assistance of the outside world in developing their own immense resources. During the war, six or seven billions of dollars of European capital, invested in South and Central America and the West Indies was withdrawn. This has left that section of the world with no resources for development. Without development of resources there is no money with which to buy.

Our own financial condition is sound, said Mr. Kies, and the United States is in a position to become the financial center of the world. Renewed purchasing of American goods by the other countries of the world is largely dependent on the willingness of the United States to stake those countries either by lending money or granting liberal terms of credit. Mr. Kies explained that the banks of this country cannot do the work of financing foreign purchases without the help of the American people. If foreign countries wish to float loans in this country as a means to purchasing their requirements here, all that the banks can do is to provide the machinery for such loan flotations; the people of the country will be obliged to invest in these foreign securities. America has a great opportunity, he said, in this work of re-financing the world, but it will require courage and leadership and a greater knowledge of foreign trade conditions.

Mr. Kies stated that the effects of the World War will not be entirely experienced by this generation. With the accumulated capital of centuries wiped out, debts have been piled upon the people of many nations that this generation cannot possibly meet. Europe will remain in a state of flux and unrest for a great many years, he predicted, and it is idle to hope that the blunders of the peace treaty and the destruction of economic solidarity in Europe can be relieved within a short time. Five new republics in Central Europe are struggling with a form of government that it took us a half century to build, and this condition will make for political instability.

German Reparations

Dealing with the question of German reparations, Mr. Kies said the German situation must be regarded in the light of a new Germany. A German labor leader told him upon his last visit to Germany that of the 58,000,000 people remaining in that country only 40,000,000 can be supported on what Germany can produce. The remaining 18,000,000 cannot migrate—they haven't the money. All that they have is their two hands with which to work. For this generation of Germans, he said, there is nothing ahead but work and saving. The policy of the country will be to hold down imports and exports as much as possible. While Germany has got to buy our cotton, copper and grain, Mr. Kies expects little other German buying in the near future. The German people are looking to the industrial and agricultural development of Russia as a means of outlet for a large part of their manufactured products. The Germans are anxious to undertake the work of rehabilitation in Russia, and Mr. Kies thinks they are the people best fitted to do this job. But he suggests that if Germany goes into Russia it be done under the supervision of the Allies.

A new Germany will make for that stability in Europe which is so badly needed. German labor is back to pre-war efficiency, said Mr. Kies, except for the physical deterioration due to undernourishment during the war. The bulk of the German workmen are intelligent and have no thought of Bolshevism. In this connection Mr. Kies commented upon the solidarity of purpose among all laboring men in Europe. They do not intend, he said, to give up the advantages gained during the war. Present economic conditions, however, are such that all the German workman is asking is a chance to work and earn a living. German labor is receiving from five to eight marks an hour, and through the depreciation in value of the German mark, German manufactured products can compete successfully in

almost any country of the world. This situation must adjust itself gradually, however, said Mr. Kies.

Reference was made to impending tariff legislation in this session of Congress. Mr. Kies thought it unwise to pass any tariff measure without the most careful study. The only pay we can get for our debts abroad, he said, is in goods. A tariff wall should be built only to keep out products which would seriously affect our key industries, in his opinion.

The American manufacturer has got to figure his costs more closely not only in selling abroad but in meeting the competition of foreign goods in the home market. Inefficient organizations will fall by the wayside. American labor has the right to-day, he said, to the most efficient management.

Extension of Credits

Closing his address by saying he was not a pessimist, Mr. Kies pointed out that this is America's opportunity, but one precedent to our prosperity is the willingness and farsightedness to make investments abroad. Industry in this country cannot prosper on our markets alone; we must cultivate foreign trade, and the best way to do it is to finance foreign countries so that they will be able to buy our goods. We can build up Europe, he said, by the extension of credits. This may be done by granting six to nine months commercial credits, by investment in foreign securities and by the investment of American money in European companies, then selling them our raw materials and machine tools. Courage and broad-mindedness are America's need if we are to take full advantage of our opportunities.

Importance of Study

A. T. Simonds of the Simonds Mfg. Co., Fitchburg, Mass., made an interesting address entitled, "Quit Deceiving Yourself," in which he dwelt upon the importance of a study of economics by every business man. The matter of business forecasting is not guesswork, said Mr. Simonds, but a more or less exact science. He related how his own study of economics had saved his company from financial and commercial pitfalls.

He believes in the action and reaction theory of some economists and has prepared charts, upon which he has based certain calculations as to the future. He predicted that commodity prices will not reach bottom until July, 1922; he predicted that normal prices would be here again in the latter part of 1924. Mr. Simonds said that these are only approximate dates and he said further that by "normal prices" he means prices which will be 40 to 50 per cent above the pre-war level.

Mr. Simonds was strong for "keeping the patient in bed" until there has been complete recovery; in other words, he deprecates the anxiety of some people to "start things up" by artificial stimulation. He thought the action of the Boston Federal Reserve Bank in reducing its re-discount rate from 7 to 6 per cent a mistake, because it will lead to the expectation of easier money generally within the near future.

Any time that commodity prices reach their pre-war level they are a "good buy" in Mr. Simonds' opinion. He cited copper as an example.

Referring to the proposed tariff, Mr. Simonds described it as a "calamitous piece of legislation." He said: "You cannot build a tariff wall and keep out foreign goods. We are going to get the world in balance again whether you and I like it or not."

Wages and Cost of Living

Magnus W. Alexander, managing director, National Industrial Conference Board, with the assistance of charts, showed the present relationship between wages and cost of living. In spite of the recent reduction of wages in many industries, Mr. Alexander said that the average workman having employment has been better off month after month because cost of living has decreased even more rapidly than wages.

Mr. Alexander believes that employers should talk in terms of real wages, not money wages. In other words, the importance of the amount of the wage is not what it means numerically, but what it will buy in necessities of life.

His charts showed that the cost of living has dropped sufficiently so that the dollar is to-day worth about 65 cents, compared with its pre-war value, measured in terms of things it will buy. The low point for the dollar was reached the middle of 1920 when its value sunk a fraction below 50 cents.

Labor in War Time

Congressman Charles L. Underhill, Somerville, Mass., was introduced to the convention as probably the only candidate for Congress who had his campaign literature printed without the union label. Mr. Underhill made an attack upon labor for its attitude during the war, when "more than 6000 strikes were called, mostly in 'closed' shops, in spite of the promise of Sam Gompers that there would be no strikes during the war."

Gompers was described as "the only man who had a key to the White House during the war." The American Federation of Labor was described as having been more powerful than the Government itself.

Jerome Thralls, secretary and treasurer of the Discount Corporation of New York, spoke of the need for foreign trade financing, and recommended to the members the work of the Foreign Trade Financing Corporation. He said that a $10,000,000 inquiry for electrical equipment was lost to American manufacturers because of their inability to finance the deal, although the French Government had agreed to furnish a guarantee of payment.

Readjustment Problems

An open discussion of the following questions was held Thursday morning: What reductions in working forces are necessary, what are the best methods to follow? Where reductions in wages are imperative, what is the most equitable and practicable course to pursue?

In discussing the first question some leaned to the view that men who have been long in the employ of a company should be given preference in the event that a reduction in working forces is necessary; also that men of families should have preference over single men. Some said they had tried to give all of their men a few days work a week, rather than lay off a part of the force all of the time.

Reductions in wages, it was said, should be based upon the cost of living and reductions should not come more rapidly than living costs decline. Some speakers said that the question of hours is of greater importance than that of the wage rate; that the metalworking industries should get back to the 9 and 10-hr. day basis if they hope to be able to compete successfully in the coming struggle for business among the nations of the world. There was also a feeling that where the 8-hr. day is continued no pay for overtime should be given unless the employee has put in at least 48 hours during the week.

One manufacturer stated that he had given instructions that no employee who had been in the service of the company for one year or more should be permitted to go in want whether there was employment for him or not.

The Steel Strike Report

The Rev. E. Victor Bigelow, Andover, Mass., who came into the limelight some time ago by the publication of a pamphlet, "The Mistakes of the Inter-church Steel Report," elaborated somewhat upon the statements he had made in that paper. He charged the Inter-church committee with unfairness in employing the investigators it did, saying that these men were prejudiced in favor of the union labor movement and obsessed with opposition to big business. He said that it would be just as fair to send a committee of vegetarians to investigate the packing houses. Mr. Bigelow paid a tribute to Judge Gary, chairman of the United States Steel Corporation, which was roundly applauded.

Industrial Training

The remainder of the session dealt largely with industrial training work. Philip C. Molter, superintendent of this branch of the association's activities,

read a report of progress and was followed by George A. Seyler, works manager, the Lunkenheimer Co., Cincinnati, who related his experience in installing a training department. This company began its training of workmen during the time of the Cincinnati machinists' strike last year. A department which would graduate 10 men a week was arranged for, it being assumed that the average period of training would not exceed two weeks. The idea was to train specialized operators and not to teach apprenticeship courses.

The equipment for the training department consisted of the following:

One testing apparatus, to be manned by two men, one boring mill, one speed lathe, one punch press, two drill presses, five monitor lathes of various sizes, one heavy duty production lathe, one hand screw machine, one forming lathe, one hand-operated two-spindle milling machine, one air-operated two-spindle milling machine and an assembly bench, with ample space and equipment for four men.

"In planning and selecting a location the conclusion was reached to isolate the training department from the production departments," said Mr. Seyler. "This we believe to be of great advantage for under this plan the students, having their own workroom and locker-room, do not come in contact with any of the workmen until they graduate into the main shops.

Induction Into Training

"In the induction of a man into our training department he is first interviewed by the employment manager, then turned over to the director of training, who puts the new man at his ease. He is able to speak to him in a moderate, pleasing tone, as it is not necessary to shout in order to be heard above the din of machinery, as is the case in the main shop. He does not bother the man about his registration card as this matter has been attended to for him. He also gives him a memo. card upon which is written the clock number, locker-key number and machine number, and tells him to carry this with him to remind him of the numbers 'Lest he forget.' He is extremely careful not to crowd the new man with too many impressions, realizing that the human mind can absorb but a few teaching points at a time, and that it is a futile effort to begin teaching additional points until the first have been assimilated.

"There is no confusion in the beginner's mind caused by comparing himself with his fellow-workmen in regard to production, as he is informed that everyone else in this department is undergoing training. He feels about the same as we do when, yielding to a wild desire to wear a straw hat early in the season, we walk down the street and discover that some other brave spirit has dared to do the same thing—he has a sense of ease and satisfaction in knowing that he is not entirely alone in the world.

"Under the old method of inducting a worker into the shops, he was instructed in each step as he progressed by the simple means of being told what to do; or in other words, he followed out a series of commands to do this first, then that, then the other thing, and so on. The instructor, after giving about 15 or 20 direct commands usually asked the question 'Do you understand?' The new workman, for fear of being criticized or being judged as dense or dull-witted, would usually answer 'Yes.' It is possible for a man to mimic perhaps 10 or 12 given motions and remember them as they repeat in their cycle. He is able to reduce them to a habit and thereby pass muster with his instructor as a man who will 'pick up,' during which time he forms bad habits of posture and manipulation of his implements, which we all know takes months to correct after the habit has once been firmly fixed or formed.

"Without proper or intensive training a beginner in many instances, following the line of least resistance, or through fear of being reprimanded, will turn to the man working next to him for help, instruction or information of some character regarding the task which has been given the beginner to perform. This immediately establishes a bond between the two men which may work to the material disadvantage of the beginner, especially if the 'old hand' is inclined to be radical in his thoughts, tricky in his methods or jealous in his nature.

"The beginner's best friends in the shop are the director of training and his assistants, to whom the student may appeal at any time for additional instruction, and you can bet your bottom dollar that these men think straight and are able from time to time not only to teach and instruct the beginner in the manipulation and handling of his machine or tools, but also give him a viewpoint that is extremely difficult—in fact, impossible—to be overcome by the soap-box agitator.

"Man was not created to accomplish things in this world by imitation or instinct, but to act and be governed in his every undertaking by the action of his mind—and mind means reason. It is indeed surprising how absorbed a man can be in anything that he undertakes if he is constantly studying the reason for each step as the undertaking unfolds. It is noticeable in shops using the old method of inducting workers, that the instructor is doing all the work himself while the new man is standing by, and one can see written on his face the desire for a chance to do the thing himself. We have all laughed over the joke about the man learning the barber trade through correspondence school, but it is not far fetched to say that we have been practising that same method in a mild form. One of the principles in a training department is that a man learns by doing. It is not necessary for an instructor to touch a machine when training a student, but can have the student do all the work himself—providing the instructor can teach by means of reasoning each step as they progress.

"Suppose you were called upon to teach a man to operate a lathe. Where would you begin? Would you begin with the shifter or with the tool and the tool-post, or with the tail stock, or lead screw, or the spindle, or would you do like a great many instructors—teach a little of this and a little of that? The effect on a pupil being taught by an instructor who has not analyzed a progressive method of teaching is like reading a magazine or a book wherein the printer failed to have the pages come in regular sequence, and following page 1 would be 46, then page 8, then 84, then 12, then perhaps 3; and so on. The story would not appeal to you because it would not be consecutive, and you would mighty soon make up your mind that you could not make head or tail out of a story got up in this fashion.

Knowing the Student's Mind

"To discover whether or not a student is reasoning during the process of teaching, it is necessary to know what is going on in the student's mind, and the method to find this out is to ask questions that will make him think in order to give a proper answer. The question, 'Do you understand?' with the answer 'Yes' or 'No,' does not mean anything, but the question 'Why did you push that lever?' causes the student to think, to give a reason for his action. This in turn gives the desired information immediately, and leaves no doubt as to whether or not a proper understanding exists.

"While this interesting development is going on, the student is learning that the length of time necessary in the training department after mastering the equipment and performing work properly, will depend upon his ability to reach efficiency in production. The number of pieces of work produced each half-hour is counted for him and registered on a card, and he is able 16 times a day to judge his own progress.

"Since its installation last fall, 80 odd men have passed through our training department. We have found but two who did not fit in and had to be dismissed because they absolutely lacked latent mechanical ability. Of the balance who graduated from the department, six have left our employ. As a part of the routine the graduates are brought to the office of the works manager for a little personal talk, and it is found in these talks that they consider it a privilege to go up into the main shops; and they incidentally find that the 'bosses' are human beings like themselves and not the horned Beelzebubs, or other more-or-less endearing terms applied now and then to employers.

"After 10 of these graduates had been placed on production in various departments of the main shops, inquiry was made of the foremen as to their opinion of the men sent to them from the training department, and in every case the opinion was expressed that the employment manager had selected extraordinary men for training, as the standard of intelligence and efficiency had shown such marked improvement over the standard with which the foremen had been accustomed that they concluded that in the past the employment department had provided them with men of the poorest quality obtainable. When told that students sent to the training department were ordinary average men from all walks of life, and inexperienced in our line of work, they were inclined to doubt the statement. The foremen were then asked as to how the students qualified in comparison with men trained in the production shop under the old methods, and the answers were that the students at the time of entering the shops were equal to men who had been working in the shops from six to nine months. New high records were made by some of the students from the training department within a short time after being put on production work.

"Appreciating the many advantages in training men for production, the thought was impressed upon our minds that the function of the training department, its equipment and organization could be further extended by giving the assistant foremen what might be called a post graduate course. This training is now going on and the results are most encouraging. Thirty-six assistant foremen are in training, divided into classes of six each—each class having an hour's instruction during the day. Two nights per week are devoted to class ensemble, under the tutorage of Mr. Flagler of the University of Cincinnati (an assistant to Prof. McDonald). The organization and continuation of the classes was purely voluntary on the part of those enrolling, there being no remuneration whatsoever, and there being an understanding that if anyone felt that there is no benefit to be derived from attending the classes there was no obligation to continue. So far they have found the instruction of sufficient interest to keep them absorbed throughout the class period, there have been no absentees, and in many instances the number of 'jobs' assigned for preparation in teaching analysis have been increased voluntarily by the men. In fact, the night classes as a rule extend beyond the time allotted, due entirely to the enthusiasm and interest on the part of those attending."

J. E. Goss, supervisor of apprentices, Brown & Sharpe Mfg. Co., Providence R. I., read an interesting paper on "Modernized Apprenticeships," which is reserved for publication in a later issue.

Valuable Suggestions

The discussion on industrial training closed with an address by D. J. MacDonald, professor of vocational education, University of Cincinnati, who distributed leaflets showing in outline the methods pursued by the University of Cincinnati in training instructor foremen. He made the following suggestions, based upon his experience in teaching foremen:

The main factor in building up true teaching ability in foremen is competent leadership. Men who can do this kind of work satisfactorily are rare indeed. I look forward to the time when training men to do this work will be a regular practice. To my mind it is both practicable and feasible, and I am now at work on the proposition.

I do not see any good reason why industrial plants should hesitate to train their own foremen along these lines. The rock upon which they are most likely to meet ruin is that of inadequate leadership. In choosing a leader, therefore, let them bear in mind that there is a vast difference between being a good teacher and knowing how to train others to teach effectively. The danger is that industrial executives attempting to put over such a program will fail to attach due weight to this latter.

In case leadership from the outside is used, it is advised strongly that shop conditions obtain in or near the class room, for the reason that trying to put ideas across is the backbone of any successful course of this character. We shall always "learn to do by doing."

The one directly above the man on the job is usually the logical candidate for training of this sort. But if the job is to be put over successfully, it will ordinarily be found advisable to "sell" the head foreman on the proposition.

The teaching habits which foremen have the greatest difficulty in acquiring are:

1. Analyzing the job to be taught from the standpoint of the learner, i.e., determining the sequence of the learning difficulties in the particular job.

2. Standing to one side and by means of well-formulated and appropriate questions, directing the learner in such a way that he things his way through his job.

The habits hardest for the foreman to overcome are:

1. Telling or showing the worker what to do, even though this may mean calling attention to from 20 to 50 distinct and new points, many more than any mind can possibly remember.

2. Showing impatience in one form or another.

3. Acting before analyzing, thinking the thing only part way through before starting something.

The Metric System Bill

W. C. Wilson of the American Institute of Weights and Measures, New York, spoke briefly on the Britton bill, which was introduced in the House of Representatives April 11 "To fix the metric system of weights and measures as the single standard of weights and measures for certain uses."

Under the provisions of this bill, after a 10 year waiting period, it would be unlawful for anyone to sell any goods, wares or merchandise, or charge or collect for carriage or transportation of any goods, wares or merchandise, *in or according to any other system than the metric system of weights and measures*.

"The avowed purpose of the bill," said Mr. Wilson, "is to make its provisions applicable to *trade* and not to *manufacture*. But if the domestic market, which is the great dominating factor, becomes metric under this compulsory law, then, in order to adapt his product to the requirements of trade, the manufacturer would find it necessary to change to metric in an effort to avoid the complications and loss which a continuance of a legalized *dual system* would impose. In other words, while Section 8 of the bill pretends to release the factory from the operation of the law it simply cloaks a scheme for creating such a condition of confusion as would automatically force the metric system on American industry in order to escape an impossible situation.

"The 10-year waiting period would be such a period of flux and turmoil as would effectually block further standardization and would simply increase the evils noted in the foregoing paragraphs.

"The bill is cleverly drawn with the idea of making it an *entering wedge* for further legislation. As it stands if enacted into law, it would be simply a piece of legislative camouflage. It announces a program with a great flourish, but the bill carries no penalties, an essential of any mandatory act, and provides no machinery for putting it into effect by compulsion.

"The danger does not lie there. The bill is a bait, a trap to catch the unwary. It seeks to lull into a sense of false security by postponing the day of judgment for 10 years and by omitting the pains and penalties which were conspicuous in some former metric bills.

"What the metric party is particularly after in this bill is to get Congress *to sanction the principle of compulsory metric adoption*. First get Congress pledged to the metric adoption theory and the rest will be easy."

Rev. Dr. Rice's Eloquent Address

Dr. Merton S. Rice, a Detroit clergyman, was the speaker at the annual banquet of the association Wednesday evening. He dwelt eloquently upon the glory of work, the need for more human relationship between employer and employee, the tremendous opportunities which face America in the reconstruction of the world and the responsibilities to be borne by this generation—greater, he said, than any generation in the world's history has ever known. He spoke for two hours, his eloquence and sincerity keeping his listeners in rapt attention.

Finishing Process for Seamless Tubes*

Rolling the Hollow Tube on the Pilgrim-Step Mill — Details of the Whole Process from Ingot to Finished Tube

WORKING a hollow ingot on a mandrel, between rolls, in such manner that at each revolution of the rolls a small portion of the ingot is rolled to a tube, is the essence of the Pilgrim-step finishing process. The part of the ingot that is turned toward the roll is called the front part and the opposite the rear part. Practice has shown that properly the rolls turn in the direction from the front end to the

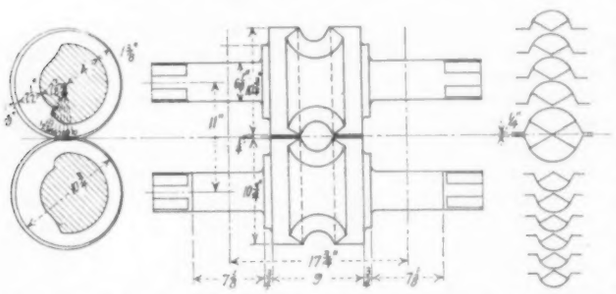


Fig. 37—Pilgrim Step Finishing Rolls, Showing Pass Sections on the Rolling Cone

rear end of the ingot, therefore opposite to the ordinary rolling process in which the work is drawn in between the rolls.

In practice with the Mannesmann rolling process the roll is designed as shown in Fig. 37, showing an increase of the pass such that at one place in the rolls an opening is allowed somewhat greater than the outer diameter of the hollow ingot. The pass gradually contracts on the periphery of the rolls until it reaches the outer diameter of the finished tube. In discussing the details of the working process in the various positions of the rolls, this point will be further considered more closely. Like rolls for round bars, these rolls are somewhat open at the sides, which is an important condition for tube rolling in order that the tube shall not be rolled fast on the mandrel.

In introducing the material into the rolls, after they have pushed it back at each operation, the so-called feed device allows to the mandrel on one hand an elastic reciprocation, and on the other hand gives it (with the hollow ingot upon it) a stepped movement forward. The operations in the rolls (Fig. 38) proceed as follows:

Position 1 of the rolls shows the diameter of the pass with an opening such that the hollow ingot can be pushed in between the rolls. That it be not pushed too far, a stop is provided back of the middle of the roll, so placed that only so much material shall be presented to the rolls as they are able to roll out in one revolution. This for the smaller mills is about ¾ in. of the length of the hollow ingot. On further turning of the rolls in the direction of the arrow the ingot is engaged by them, as shown in position 2, because the pass at this point begins to narrow. By action of the so-called rolling cone the pass further contracts during the progress of the revolution until the correct tube diameter is reached, as shown in position 3. The rolling process proper therefore takes place during the rotation of the rolls from position 2 to position 3.

During these two last mentioned operations the ingot with the mandrel is pushed back. This powerful return motion of the mandrel with the ingot, caused by the rolling, acts against a spring or air pressure in the feed device. This pressure, especially at first, is less than the pressure with which the work is thrust back by the roll. But as soon as the roll again lets go the work, the hollow ingot with the mandrel is again thrust forward as far as the stop permits. In order that the tube may again be released from the roll, the roll has at this point, as shown in position 4, an enlargement of the groove rising to a size of pass through which even the outer diameter of the ingot can go. Position 5 shows the situation immediately before position 1, and thus the rolling operation begins anew.

It is further to be noted as of special importance that at each revolution of the rolls the ingot is revolved about 90 deg., so that after each roll rotation it has to be turned through this angle. The mandrel is turned by the feed device, an extension of the bar being helically guided during its reciprocation.

A patented feed device in which the turning of the work is independent of its thrust is shown in Fig 39. On the mandrel bar *d* is fastened the ratchet wheel *m*. The collar *h* surrounding this ratchet wheel, with the pawls *i* (see the cross-section) is engaged by a slide *t* attached to the mandrel bar and by means of a pin *h'* engages in the helical groove *p* of the carriage or slide *s*. This helical groove forms a straight line at the end turned away from the roll train, so that the rotation of the work always occurs toward the end of the forward movement, and is independent of the length of thrust of the work. The device can therefore be used to advantage in pilgrim-stepping such tubes as, with regard to their cross-section, must always be turned by only a certain angle, so as to enter them correctly between the rolls.

The slide *t* is as usual provided with springs, which

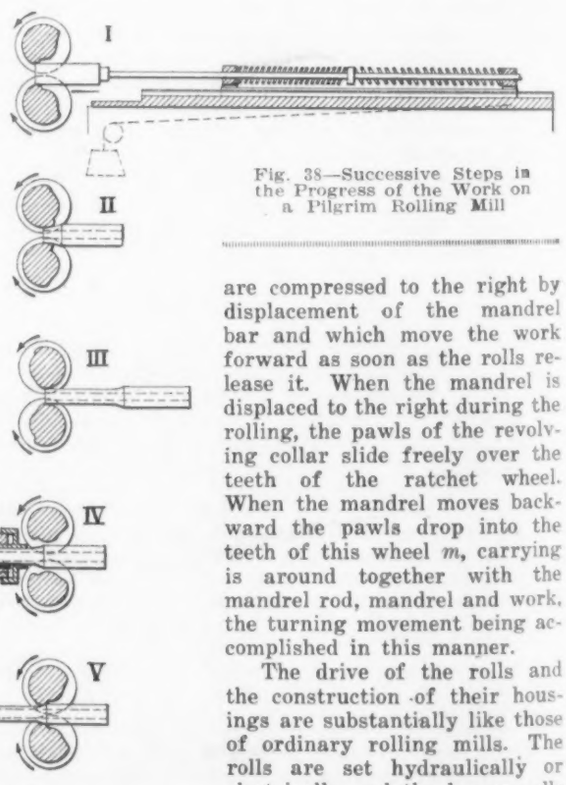


Fig. 38—Successive Steps in the Progress of the Work on a Pilgrim Rolling Mill

are compressed to the right by displacement of the mandrel bar and which move the work forward as soon as the rolls release it. When the mandrel is displaced to the right during the rolling, the pawls of the revolving collar slide freely over the teeth of the ratchet wheel. When the mandrel moves backward the pawls drop into the teeth of this wheel *m*, carrying is around together with the mandrel rod, mandrel and work, the turning movement being accomplished in this manner.

The drive of the rolls and the construction of their housings are substantially like those of ordinary rolling mills. The rolls are set hydraulically or electrically and the larger rolls are hydraulically balanced. The roll drive is through spindle housings as usual. Owing to the shocks occuring at each revolution of the rolls when they seize the material, and the shocks of the stop, the housings are best made only of cast steel. Care must be taken to provide a strong foundation for them. In small rolling mills the stop may have a spring action (Fig. 40) but in the larger mills, for tubes up to 11 inches, it consists of masses great enough to sustain the shock. Figs. 41

*Abstract of doctoral thesis by Dr. Karl Gruber; translated from *Stahl und Eisen*. Final of four installments; the others appeared in THE IRON AGE of April 7, 14 and 21.

and 42 show substantially how one of the older rolling mills of this sort is arranged.

As already stated, the feed arrangement is intended first to produce the stepped displacement and further to give the reciprocating movement to mandrel and the extended mandrel bar, and at each revolution of the rolls to turn the ingot 90 degrees. As shown in Fig. 42 the feed was formerly accomplished by a weight hung on the carriage. To the carriage was attached also a second chain which could be released by a special device when the feed of the carriage should be operated. Therefore after each revolution a return was permitted, the weight coming into action. Both of

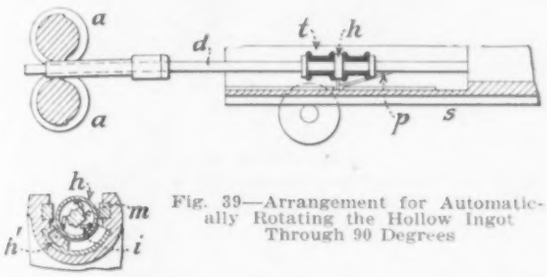


Fig. 39—Arrangement for Automatically Rotating the Hollow Ingot Through 90 Degrees

these designs have later given place to hydraulic mechanism.

The reciprocating movement of the mandrel rod, which corresponds to about the length of the roll periphery, takes place between springs. Since these springs are a source of numerous accidents they have lately been replaced by pneumatic cylinders. The arrangement for turning the mandrel rod has already been described. The mill for rolling 2 to 3½-inch tubes runs as high as 250 r.p.m., the medium sized ones at some 70 to 100 and the largest at only about 30 r.p.m.

Figs. 44, 45 and 46 show three diagrams (taken on Briede finishing rolls) which have turned out very much like the results in the Mannesmann rolling mills. They are for passes of 2¼, 3⅛ and 3⅞ in. outside tube diameter. These tubes are some 26 ft. long and are rolled without reheating, that is to say, at the heat with which they come from the oblique rollers. If we consider the diagram of the 2¼-in. pass we find first a simple work diagram which shows the load on the driving motor when rolling with only one set of housings. In the curve the various points which show how the work is grasped at each revolution are greater or less according to the accuracy of the control. If too much material is put into the rolls the peaks are higher. And the curve at the end of the tube slowly rises because the metal is gradually cooling.

The next curve shows a double working diagram. For the first half a single tube was rolled, employing only one set of housings; then about in the middle of the diagram material was put into the second housings, which caused a corresponding increase of power consumption. After the first tube has been finished the curve drops back to the normal power consumption for one set of housings.

The Briede rolling mill, for certain reasons, does not permit the use of a flywheel, while the Mannesmann rolling mill, apart from the fact that it can run with these small passes at higher speeds, can utilize a flywheel, which better equalizes the curve peaks.

General Layout of Mill for Making Seamless Tubes

The operations in the rolling mill for making seamless tubes can in the main be resolved into six parts, as follows:

1. Preliminary work in supplying the material so that it is suitable for the roughing (oblique) roll train.
2. The operation in the oblique rolling mill.
3. The operation in the finishing rolling mill.
4. The hot-drawing department.
5. The straightening, cutting off and threading.
6. Operations in the tube blacksmith shop: the pressing off, upsetting, sometimes flanging, making the coupling muffs, bending the tubes, etc.

In such a Mannesmann rolling mill the several operations will be described in what follows, beginning with the manufacture of tubes up to 3 in. For the various sizes of tubes from 1¾ to 11 inches various machine sizes are necessary both in the oblique rolling and also in the finishing mills, draw benches and adjusting machinery. Information on the comparative sizes of the rolling mills for producing different sizes of tubes is given in Table III.

Table III—*Measurements of Tube Rolling Mills.*

Size of Hollow Ingot Rolling Mill Inches	Hollow Ingot Outside Diameter Inches	Pilgrim Set		Tube Outside Diameter Inches	Size of Finishing Rolling Mill Inches
		Roll Diameter Inches	Mandrel Diam. Inches		
I	3 11/16	10	1 11/16	1 7/16	10 to 11
I	3 3/8	10	1 11/16	2 1/16	10 to 11
I	3 5/16	10	2	2 1/16	10 to 11
I	3 3/4	10	2 1/16	2 1/16	10 to 11
I	4	11	2 1/16	2 3/16	10 to 11
I	4 1/16	11	2 5/16	2 5/16	10 to 11
I	4 1/8	11	2 1/16	2 5/16	10 to 11
I	4 3/16	11	2 11/16	3	10 to 11
I	4 5/16	11	2 11/16	3 1/16	10 to 11
I or II	4 3/16	14 1/4	2 11/16	3 1/16	11 to 14 1/4
I or II	4 5/16	14 1/4	2 5/16	3 1/4	11 to 14 1/4
I or II	5 1/16	14 1/4	3 1/16	3 3/16	11 to 14 1/4
I or II	5 1/16	14 1/4	3 1/16	3 1/16	11 to 14 1/4
I or II	5 1/4	14 1/4	3 1/16	3 5/16	11 to 14 1/4
I or II	5 1/16	14 1/4	3 1/2	3 7/16	11 to 14 1/4
II	6 1/16	18 1/4	3 1/2	3 7/16	17 3/4
II	6 1/16	18 1/4	3 3/4	4 1/16	17 3/4
II	7	18 1/4	4	4 3/16	17 3/4
II	7	18 1/4	4 1/4	4 5/16	17 3/4
II or III	7 7/16	18 1/4	4 1/16	5 1/16	17 3/4
II or III	8 1/4	18 7/16	5 1/16	5 3/4	17 3/4
III	9 1/4	25 5/16	5 1/16	6 1/16	25 5/16
III	10 1/16	25 5/16	6 1/16	7 1/16	25 5/16
III	11 1/16	25 5/16	7 1/16	8 1/4	25 5/16
III	12 1/16	26	8	9 1/4	25 5/16
III	13 1/16	26	8 1/16	10	25 5/16
III	14 1/16	26	9 1/16	10 3/4	25 5/16

Size I Mill has rolls 14¼ in. diameter: size II, 17 1/16 to 17¾ in.; size III, 22 in. Mandrel diameters on these oblique rolling mills are about 1/16 in. greater in the smaller mills, up to ⅛ in. greater in the larger mills, than those of the Pilgrim mills. The latter differ, at the two ends of the mandrel, by about 0.04 in.

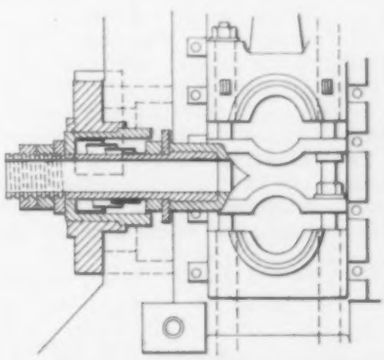


Fig. 40—Bearings for the Rolls and Exit Guide on a Small Pilgrim Rolling Mill

Preparation of Material for Use in Oblique Rolling Mill

The tubes of about 2 to 4 inches are made of rolled round bars, and as a rule the bars are supplied in lengths as rolled. These bars must be divided into pieces 16 to 24 in. long, depending on the length of the tubes that are to be rolled out. Since a square cut is unnecessary, the bars are notched on both sides and broken off with a hydraulic ingot breaking press of 1000 tons pressure. In the lower part of the press a cutter, temporarily inserted, is forced into the material by the upper cutter which stands vertically over it, thus notching opposite sides of the bar simultaneously. After the upper cutter has been raised, the lower one can be drawn out and the bar rests freely on two supports about 32 in. apart. Under renewed application of pressure the bar is broken off at the notched

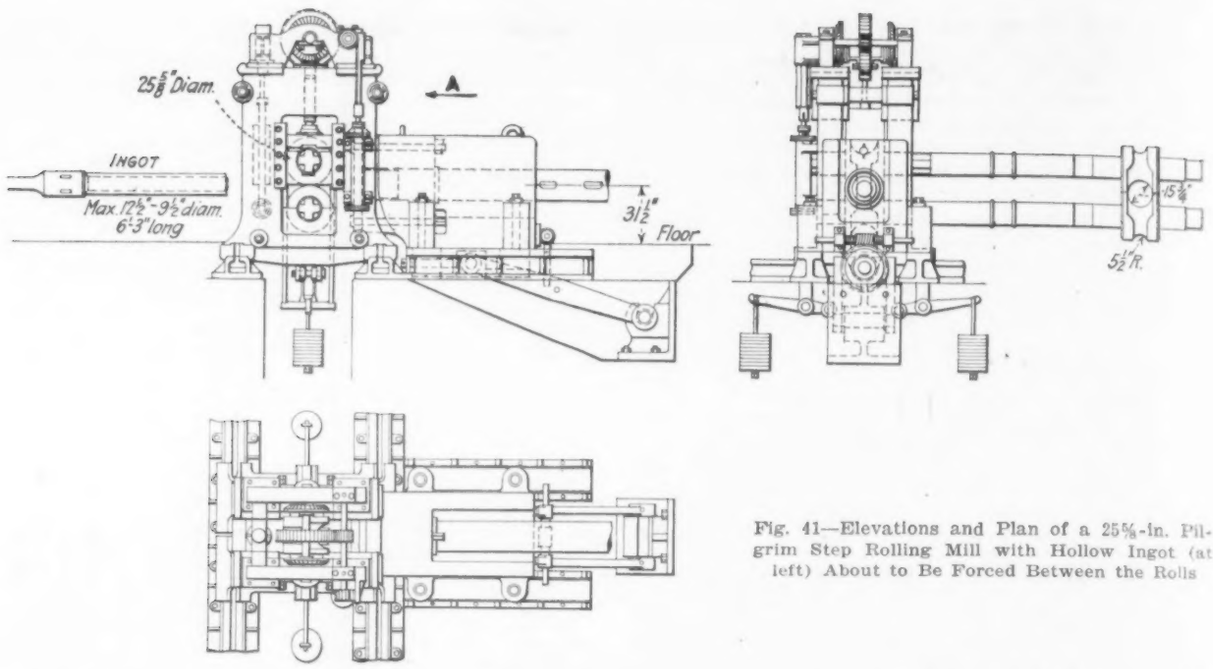


Fig. 41—Elevations and Plan of a 25⅝-in. Pilgrim Step Rolling Mill with Hollow Ingot (at left) About to Be Forced Between the Rolls

place. The small ingots thus obtained are carefully inspected, cracked material is thrown out and roll scale removed, since this hinders the oblique rolling process.

To begin the oblique rolling process more easily, and also to facilitate the operation in the oblique rolls at the latter end, these little ingots are centered at each end. This centering of the ingot end is not absolutely necessary for the smaller diameters. In any case it is not intended to provide a centering guide for the mandrel, since the ingot gets a cavity from the oblique rolling action before it reaches the mandrel point, as appears in Fig. 4.* The little ingots are now placed in a heating furnace and there brought to a welding temperature.

In the Oblique Rolling Mill

From the furnace the ingots are brought to the feed trough of the oblique rolling mill, which lies between the two roll driving rods. The ingot-pushing device thrusts them into the cone of the rolls until they are grasped. It is important that previously the rolls shall have been correctly set, and that the mandrel counter bearing shall be in the right vertical and longitudinal position. The oblique rolls, turning uninterruptedly, roll the work hollow as it passes longitudinally through the rolls and over the mandrel, so that the rolled hollow ingot hangs around the mandrel rod. The mandrel counter-bearing is then opened and folded back, so that the hollow ingot can be drawn off of the mandrel rod. The roll is set with the lateral adjusting devices, which in the present case can be operated separately at the front and rear housings. Also the upper roll and the lower lineal guide can be set, and before the work proceeds must be set, at the correct pass dimension.

That the mandrel may be held free in the middle of the roll, a mandrel-centering appliance is provided which can be operated by a foot lever and then withdrawn as soon as the mandrel is inserted in the hollow ingot. Since the mandrel, especially by the final process, is under considerable stress and is easily affected by the glowing hot metal, several mandrels are kept on hand. These must repeatedly be stamped to size afresh. The lighter ingots (which we are now considering) are then brought to the finishing rolls by aid of an overhead tramway.

In the Finishing Mill

The hollow ingot, now from 32 to 60 in. long, is rolled out in the same heat by the finishing mill, to a tube 20 to 33 ft. long and with a wall thickness of say, 0.08 in. For this purpose the hollow ingot is mounted on a mandrel, the so-called pilgrim mandrel, which a feed device can move axially and can rotate during its reciprocation. The pilgrim rolls, running continuously, grasp the work and roll it stepwise from the great wall

*Page 904, THE IRON AGE, April 7.

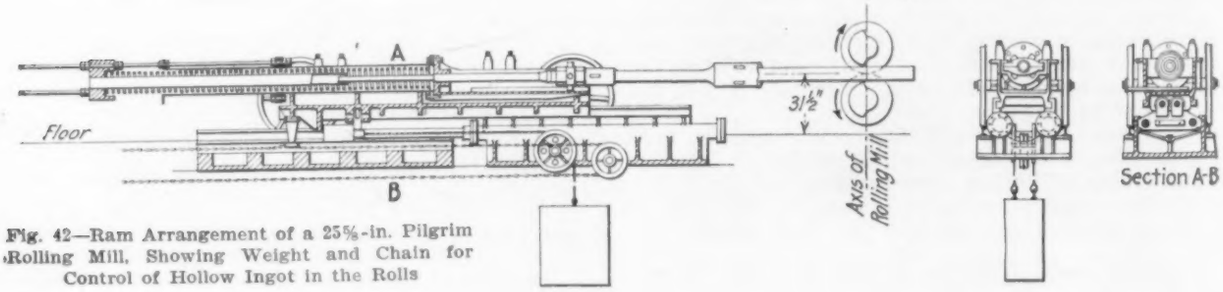


Fig. 42—Ram Arrangement of a 25⅝-in. Pilgrim Rolling Mill, Showing Weight and Chain for Control of Hollow Ingot in the Rolls

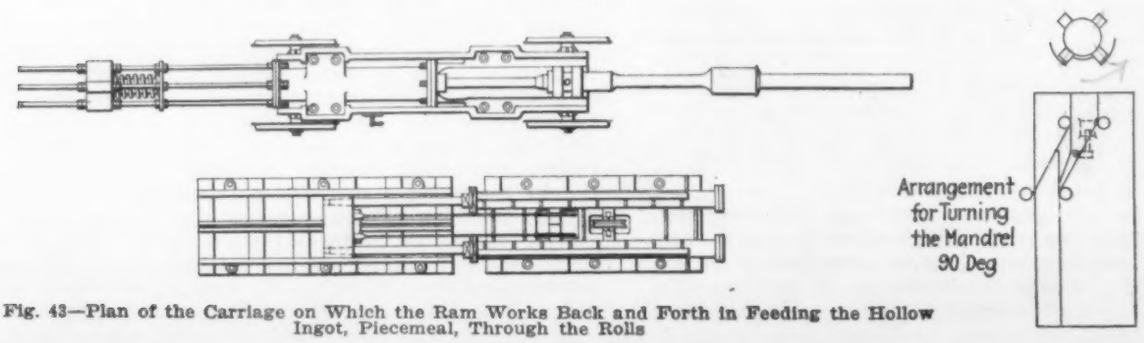


Fig. 43—Plan of the Carriage on Which the Ram Works Back and Forth in Feeding the Hollow Ingot, Piecemeal, Through the Rolls

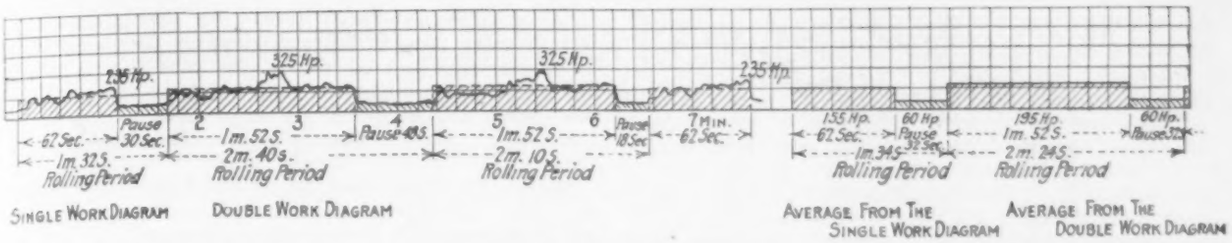


Fig. 44—Work Diagram Showing Power Consumption in the Rolling Process on a Pilgrim Mill in Rolling a Tube of 2¼-in. Outside Diameter

thickness of the hollow ingot down to that of the tube. The finished tube pushes itself opposite to the rolling direction over the mandrel and behind the rolling mill is carried by guide rollers in the axis of the feed device. The tube leaves the finishing roll still red hot, with the several pilgrim-step motions still perceptible upon it.

Since the hollow ingot, which at the start is at a welding heat, is rolled on the mandrel, this is unavoidably subject to heating up and change of shape under the rolling pressure. Therefore a whole series of mandrels is necessary, for after being used once they must be cooled. That the tube can be more easily drawn from it, the mandrel is about 0.04 in. smaller at the front than at the rear end. The upsetting of the mandrel is done on hydraulic mandrel-upsetting presses between dies, the mandrel being heated and pressed together lengthwise so that it returns to its earlier diameter. It is smoothed in a cold state with steam hammers.

Drawing the Tube

Because of its irregular surface, the tube coming from the finishing rolls is not suitable for all purposes. It appears generally desirable then to draw it through a die, which for boiler tubes is absolutely necessary. For this purpose the rear end, which, moreover, is often imperfectly rolled out by the pilgrim-step mill, is pointed to an angle in a heated state. The pointing machines or hammers are installed at the side behind the finishing mill. The tubes are then put into a heating furnace where they are brought to red heat. From there they go to the so-called scraping bench.

This is a chain draw-bench on which the tubes are drawn through a die to correct outside size, and at the same time the diameter can be reduced, according to the number of draws. The inner surface of these tubes is perfectly smooth since they have been rolled over a round mandrel, and this drawing smooths the outside also, rendering them suitable for locomotive-boiler tubes. The cold draw-bench, which demands very high power, and which in other tube-rolling processes is absolutely necessary for reducing the wall thickness, is absent from the Mannesmann rolling mill, so far as tubes with normally thick walls are concerned.

Straightening the Tubes, Inspecting, Cutting Off and Threading

The tubes must now be straightened axially. For the smaller tubes this can be done with oblique roll straightening machines, in a cold or slightly heated state; for larger tubes with ordinary straightening presses, which are used also for straightening beams. The smallest tube sizes are also largely straightened by hand on surface blocks. The straightened tubes are then brought to a rack where a workman can examine the outside to see if there are cracks, holes or other faults, and if so to discard them from further operations.

The tubes found to be in good condition still carry at the rear end the angle from the drawing process, and are also partly unserviceable at the front end, so that they must be cut off at both ends. For this purpose double-ended cutting-off lathes are used with a hollow spindle through which the tube passes. It first has its bad front end cut off at one end of the machine. Then the tube is thrust through the hollow spindle so that the other end may be cut off by the second tool-holder.

The tubes that are to be used as muff or flanged pipes then go from here to the blacksmith shop. Those that are to be threaded go to the threading machines. The thread-cutting machines are generally double ended, with a hollow spindle, similar to the cutting-off lathes, and the threads are cut on them. In the making of special dimension tubes and also gas pipes, exact-working thread-cutting machines are particularly important. Before and behind these cutting-off lathes and thread-cutting machines are placed further racks, so

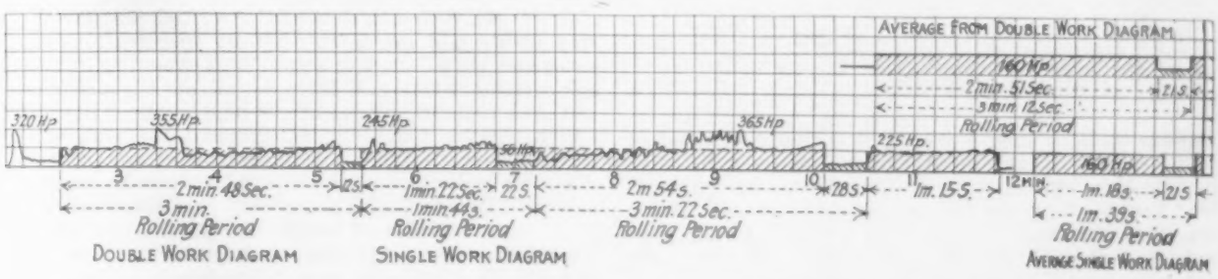


Fig. 45—Work Diagram Showing Power Consumption for a 3⅛-in. Outside Diameter Tube on a Pilgrim Mill

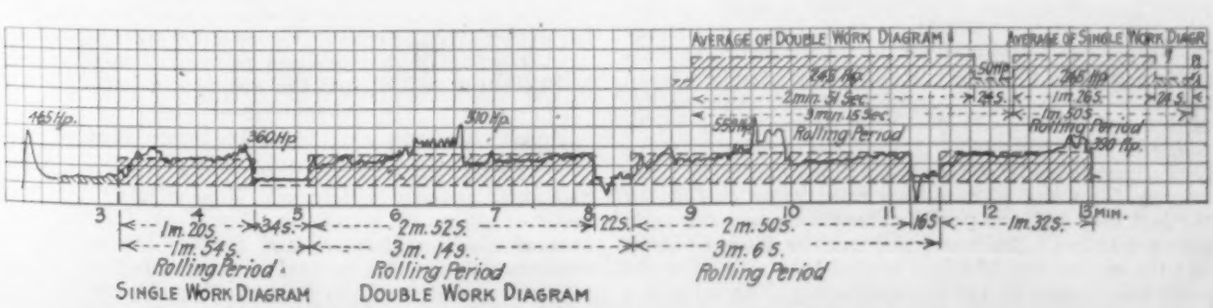


Fig. 46—Work Diagram for a Tube of 3⅞-in. Outside Diameter, Showing Power Consumption of a Pilgrim Mill

that the tubes can be rolled onto the high position of the hollow spindle.

In the Tube Smith Shop

Tubes brought by traveling cranes or narrow-gage cars to the tube smith shop are here first tested by inside pressure. For this purpose they are mounted by both ends in the hydraulic tube-testing press, tightened by coupling pressure and filled with water. High pressure is applied, and they are inspected along their sides to see that there are no places where water trickles or sprays out. After this operation the tubes are brought to the upsetting presses where, according to the purpose of the tube, either flanges are pressed on or muffs are jumped on. The muff tubes are then tarred as a rust preventive, for which purpose several works have erected so-called automatic tarring plants.

These are the operations on small and medium tubes and they are also substantially adapted to sizes from 8 to 11 inches, but in that case the oblique rolling process is modified. Moreover cast ingots are then employed which are slightly tapered, and for the larger tube diameters they are cast to conform with the weight of the tube, while for the smaller diameters the ingots are broken into parts.

Each ingot prepared for a length of tube is brought into the heating furnace by a hydraulic device. For

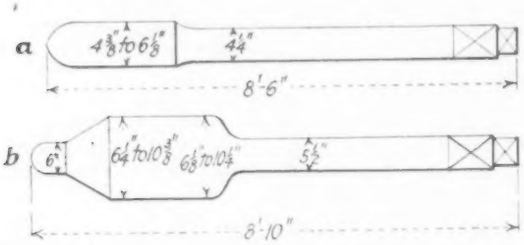


Fig. 47—Mandrels for a Hollow Ingot with Cavity of (a) 4⅜ to 6⅛ in. Diameter and (b) 6¼ to 10⅜ in. Diameter

making tubes of over 8 inches, it is first hollow-rolled to 6 in. bore in the large oblique rolling mill, after having been brought to a welding heat. In the same heat the ingot passes through another process. After the ingot mandrel of the oblique rolling mill has been changed for an expanding mandrel, (Fig. 47) the ingot passes a second time through the oblique rolls and is expanded to the bore required for that size of tube. That it may be possible to put the ingots in the furnace again before this operation, a special hollow ingot furnace is provided for the oblique rolling mill. After the second pass of the ingot through the oblique rolls it is brought, if still hot enough, to the pilgrim rolling mill and rolled to size with one pass like the smaller tubes.

Because of the heavy rolling pressure, the pilgrim rolling mills for the large tubes are built extraordinarily strong. The forward thrust of work by the feeding device causes heavy shocks, which have to be taken up by a special appliance. The new feeding devices with pneumatic cylinders present a substantial improvement.

It is to be assumed that for largest rolling mills the Briede process in this one point appears more advantageous, because the tube is freed from the rolls only an instant and at the end of the pass, while by the Mannesmann process the entire pilgrim pass is traversed by the tube freely and without being held fast by the rolls. At all events there is no doubt that the Mannesmann process delivers a product with a better surface than the "pendulum" roll of the Briede process, because the larger circumference of the Mannesmann roll affords a greater finishing area than the pendulum rolls, and thus the clearly perceptible pilgrim steps on the tube are better smoothed out. This can, however, be remedied in a manner first projected and carried out to my knowledge by a certain new tube mill. The tubes coming from the pilgrim-step rolls, after cutting off the last step end, are passed through a round-roll train over a mandrel. The round roll must be designed about like the earlier wrought-iron welded tube rolls. For the large tubes made on the Mannesmann rolling mills this last operation has not been found necessary.

As a rule these large tubes are straightened in straightening presses, but straightening machines with hyperbolic rolls can be used if the tube is previously heated. The arrangement could be about the same as has proved advantageous for large tubes in American wrought-iron welded pipe mills and has also been introduced into several German works.

Large seamless tubes, like the small ones, have found extensive application. They are not only used as bore and muff tubes but to a considerable extent for masts and carbonic-acid gas cylinders. It is safe to expect that in the next few years the seamless tube will crowd out the welded up to 14 in., and that they will be increasingly produced, because they do not require the previous making of the strips of skelp necessary for welded tubes. In sizes above 14 in. the tubes are oxy-hydrogen welded. The seamless tube has also already partly won over the department of gas-pipe manufacture, for which previously the so-called American processes seemed common and profitable.

New Plate Mill in Operation

C. W. Sherman, president of the Dominion Foundries & Steel, Ltd., Hamilton, Ont., announced that the new universal plate mill recently installed in its plant at Hamilton at a cost of $1,500,000 has commenced operations and the production of large steel plates in Ontario, hitherto imported, has at last become a reality. This announcement is of interest to the Canadian steel trade in general. While the steel trade is undergoing a process of change at present, Mr. Sherman is of the opinion that this change has about run its course. Besides he had, he said, sufficient faith in Canada to install such costly equipment as, after years of study of the Canadian steel market, he became convinced that what was most sorely needed to take care of domestic requirements was a universal steel plate mill. "Of course," Mr. Sherman continued, "we feel that the only way such a mill can be successfully operated is by the assurance that Canadian buyers will extend to us their co-operation. Our mill is in actual operation and we can give prompt delivery of all steel required for boilers, bridge purposes, tanks, car builders, makers of heavy hardware and other like branches of the trade. All steel to be made in our mill has previously come to the United States, and for that reason we feel sure that our venture is of more than passing interest to steel men. I may add that we make all our own steel and are therefore able to make plate of any specifications that may be required." Made by the McIntosh & Hemphill Co., the plate mill is a 27-in. universal.

Shippers Oppose Advance in Freight Rates

Proposed increases in by-product coke freight rates from the Valleys to Chicago and other Western points are being opposed by shippers. The carriers propose to establish a uniform rate from Youngstown to all points to which by-product coke is shipped, in place of the diversity of rates now in effect. Shippers allege the railroads have figured out a rate which is substantially higher than existing charges.

The principal shippers are the large steel works interests in the Mahoning Valley, which find a market for a portion of their surplus production in Chicago and adjacent territory, when consumption of coke lags behind production. The steel companies complain that the proposed freight advances on fuel of this kind will tend to drive the Western buyers out of Youngstown territory. By-product coke is used in the Chicago district largely by small manufacturing plants and partly for domestic consumption, in connection with hard coal.

A meeting of shippers and railway representatives in Pittsburgh will discuss the proposed change.

American Iron and Steel Institute Meetings

The next business meeting of the American Iron and Steel Institute will be held Monday, May 2, at the institute offices, 61 Broadway, New York, for the purpose of electing directors and for the transaction of other business. The general meeting for the reading of papers will be held Friday, May 27, concerning which detailed announcement will be made a little later.

American Electrochemical Society

Corrosion Symposium at Annual Spring Meeting — Electric Furnaces for Steel and Non-Ferrous Metals — Electric Furnace Association Absorbed

A SYMPOSIUM on corrosion featured the annual spring or thirty-ninth general meeting last week at Atlantic City, N. J., of the American Electrochemical Society. Besides this large subject the program included papers on electric arc welding, electric furnaces and electric furnace problems in the steel and non-ferrous industry and electrolytic nickel. Considering industrial conditions the attendance was large, about 200. Nearly all of the authors of the various papers were present and the discussions were lively and valuable. Half of each of the three days was given over to technical papers and the other half to recreation. The meetings were held in the Hotel Chalfonte.

The Symposium on Corrosion

CORROSION in all its phases, from pure iron and copper-bearing steels up to special alloy of stainless steels, was the main topic of the convention. Papers and discussions were presented which took up the time of one whole session and a large part of another, or about half of the entire program. In all 16 papers were scheduled and presented, most of them by the authors. In most cases the discussions were animated and illuminating.

The first session Thursday morning was presided over by Dr. Colin G. Fink, consulting electrometallurgist, Yonkers, N. Y. By way of introduction Dr. Fink stated that most of the papers in the symposium were by authors who had made a life study of the subject. The general subject, so far as the program was concerned, had been divided into four sections:

Atmospheric corrosion.
Corrosion by water.
Chemical or acid corrosion.
Electrochemical corrosion.

A brief introduction to the symposium was offered in the form of a paper, "Introduction to Symposium on Corrosion of Iron and Steel" by W. H. Walker, professor of chemical engineering Massachusetts Institute of Technology, Boston, which the chairman presented in abstract. A brief portion follows:

The entire literature of corrosion is full of apparent contradictions and obvious misstatements. This is occasioned by the fact that corrosion is a most complex phenomenon and that factors which may be controlling in the results are frequently entirely overlooked. No two men have the same sample of iron and steel; the heat treatment is generally different, the analysis imperfectly known; the state of the surface and the finish is neglected, and a host of other important conditions completely ignored. No wonder the results present discrepancies.

Second, certain conclusions which in the early days seemed to logically follow from the electrochemical theory of corrosion have been shown to be erroneous and have led to disappointing results. Possibly the logic was false; but at any rate we cannot crown the theory with any far-reaching beneficial results. If I may paraphrase, "the evil that a theory does lives after it; the good is oft interred with its bones."

Corrosion may be divided into two classes—that taking place in the atmosphere with free access of the oxygen of the air, and that in positions from which the air is or can be excluded. In the first field, the work of D. M. Buck stands pre-eminently the greatest contribution made in the art of preventing corrosion since the introduction of hot galvanizing. Impartial evidence is now legion that no commercial iron or steel so well withstands atmospheric corrosion as does steel containing approximately 0.2 per cent copper. When thus alloyed even the much maligned Bessemer steel excels in resistance to corrosion the widely heralded pure open-hearth iron. Unfortunately, copper-bearing steel is not a child of the electrolytic theory, although we have no doubt that when adequate explanation of the effect of this small amount of copper is finally suggested, it will be found to be essentially electrochemical.

But a copper-bearing steel produces its own protective covering only when the oxygen concentration is high. When the amount of oxygen is limited, as when the structure is immersed in water, other protective means must be found. If all of the oxygen in a system could be removed, corrosion would cease.

The strong advocacy by Professor Walker of copper-bearing steel at once brought to the surface the old controversy between that and pure commercial iron. His statements were first combated by J. A. Aupperle, chief chemist American Rolling Mill Co., Middletown, Ohio, who in a written discussion said:

Mr. Walker has apparently lost faith in the electrochemical theory as relates to corrosion problems. This is probably due to the results which were obtained in atmospheric tests on bare, uncoated sheets. While it is a fact that in sulphuric acid of definite concentrations and also in atmospheric tests of bare sheets, copper has slowed down the rate of corrosion, the reason has not yet been made clear. It may be, however, that copper under these conditions acts in a manner to exclude the electrolyte, whereas under other conditions copper accelerates the rate of corrosion.

He referred to advertising propaganda in reference to the iron links from the Newburyport Bridge, such advertising claiming that the metal was pure, and he refers to the sheets made from these Newburyport links rusting like modern iron and the information being conveniently ignored. We conducted tests on a 26-gage sheet made from the links which analyzed as follows:

	Per Cent		Per Cent
Silicon	0.042	Manganese	0.008
Sulphur	0.014	Copper	Trace
Phosphorus	0.023	Oxygen	0.068
Carbon	0.120	Nitrogen	0.003

After the usual mill treatment for this class of material, this 26-gage sheet was corrugated and placed on a rack at an angle of 30 deg. at Middletown. It has been exposed to the atmosphere from July 11, 1913, until the present time or 92 months. In this same test we have had failures of low copper Bessemer steel in from 13 to 69 months. We have also had failures of four different 26-gage brands of copper-bearing steel in from 76 to 90 months. These results should satisfy Mr. Walker that we have not endeavored to ignore the results we have obtained by rolling sheets from the Newburyport links.

Dr. Allerton Cushman entered the discussion at this point by stating that as far back as 1905 he called attention to the electrolytic theory of corrosion. He announced that later on the program he would present some new facts which were startling and a sure source of food for much thought.

Copper-Bearing Steel

D. M. Buck, metallurgical engineer American Sheet & Tin Plate Co., Pittsburgh, then presented in abstract his paper, "Some Observations on the Mechanism of the Increased Corrosion Resistance of Steel and Iron Due to Small Copper Contents." The paper is an elaboration of the author's theory that "the alloy of copper and iron is less electropositive to the film of rust formed than is non-copper steel and the consequent decrease in difference of potential lessens the corrosion." "Later work," says the author, "indicates a probable reaction between the sulphur and copper which seems to counteract the harmful effect of sulphur and also that the structural characteristics of the rust film itself have an important bearing on the subject. The latter influence may be primary or secondary."

The paper offers data which seem to strengthen the sulphur-control or rust film theories and to stimu-

late further discussion. Tables and charts are published to confirm the theory.

Mr. Buck referred to the Newburyport bridge links by saying that certain photomicrographs of this material did not show pure ferrite but in some instances high carbon up to the eutectoid condition and not pure metal at that.

Dr. Fink suggested here that atmospheric corrosion, to which class this particular phase of the controversy belongs, depends often on heat treatment of the sheets and that the composition may thus be different. He called attention to the defect, in most papers on this subject, of a lack of a uniform basis for comparison as to surface measurement and amount of corrosion in units per square inch, centimeter, etc. A standard was highly desirable.

"Anomalies Encountered in a Study of Immersion Tests of Iron and Steel" by Dr. Allerton S. Cushman and George W. Coggeshall of the Institute of Industrial Research, Washington, was presented in abstract by Dr. Cushman. The paper is an important one and is a plea for considering all possible factors when comparing corrosion tests of iron and steel, on the ground that there are in reality so many and so obscure variables that it is very easy to draw wrong conclusions. Change of rate of corrosion is also frequently met with, so that extrapolations of short-time results are often in error. One anomaly is due to very local corrosion, where the loss in weight over a large surface may be quite small, and yet failure occurs due to highly localized pitting; on the other hand, weight loss may be higher and yet so uniformly distributed that it counts as relatively unimportant. Tests in aluminum sulphate solutions, giving curious colloidal gels, are described. The author denies the protective action of copper in steel.

A New Phenomenon

In connection with his presentation, the author took occasion to make public for the first time some striking results accidentally obtained in making certain ferroxyl tests. One of these tests had been allowed to dry up completely. It was discovered some months later that there remained in the bottom of the container a most beautiful and instructive impression or tracing in pink and blue colors of certain reactions or forces which had been active some time before. There were positive indications of lines of force radiating from certain points in the original corroding metal to other points, suggestive of important phenomena, "not perhaps fully explainable now but worthy of serious research."

Dr. J. W. Richards suggested that this was a visualization of local currents believed to exist in the process of corrosion and hence capable of being photographed in this remarkable way.

A general discussion of the explanation or theory of corrosion resisting iron and steel and their alloys was contributed by William D. Richardson, chemical engineer, Swift & Co., Chicago, in a comprehensive paper, "The Gap Between Theory and Practice in the Production of Corrosion-Resisting Iron and Steel." Practical results have been empirically obtained, says the author, and at present theory is very much lacking. Lack of fundamental data of the primary action of oxygen on metals and alloys is also hindering progress. He discusses the electrolytic theory at length and the influence of oxygen in detail as well as the role of adhering rust. Accelerated corrosion tests are studied and their defects pointed out. The behavior of copper-bearing iron, silicon-containing cast iron, nickel and nickel-chromium steels, nickel-copper steels, chromium steels and nickel-cobalt-chromium alloys is discussed. The conclusions are as follows:

It would require a rash prophet to predict what future course the development of corrosion-resisting ferrous metals would take but it may not be amiss to indicate the direction suggested by our present very incomplete co-ordination of theory and facts with respect to corrosion. Because oxygen is the dominating influence in ordinary corrosion it would seem necessary, in order to convert its malign effect into a benign one, either to employ it uder controlled conditions as an anti-corrosion agent, or to offset its influence by modifying the composition of the metal or by preventing its access. These general methods are shown in tabular form below.

1. *Prevention of Corrosion by Utilization of the Oxygen Influence:*
   By maintaining a passive surface.
   By means of adherent rust or adherent magnetic oxide.
2. *Prevention of Corrosion by Avoiding the Oxygen Influence:*
   By changing the composition of the metal so that the oxygen influence is of no effect.
   By means of protective coatings, paint, varnish, lacquer, etc.

The maintenance of a passive surface may be said to be difficult of accomplishment but not necessarily impossible. There is a considerable analogy between the passive surface of iron induced by strong oxidizing agents, such as nitric and chromium acids, and the ordinary surface of aluminum, chromium, nickel, cobalt and the noble metals.

The relationship between composition of metal and adherence of rust is unknown but two examples offer a possible clue. First, copper-bearing steel appears to produce an adherent layer of rust, and second, cast iron does also. In the latter case the rust adhesion may be due to the presence of graphitic carbon.

Naturally any effect looking to the avoidance of corrosion necessarily depends upon suitably modifying the composition of the metal. It may be possible, however, to so modify the compositions specifically that the oxygen influence is avoided. It may be this result which is attained when iron is alloyed with nickel and cobalt, but we cannot be certain at present that this explanation is correct.

Removing Oxygen from Water

The important work of F. N. Speller, metallurgical engineer, National Tube Co., Pittsburgh, was brought up to date in a paper presented by him in an abstract entitled "Practical Means of Preventing Corrosion of Iron and Steel Where Not Exposed Directly to the Atmosphere." The author stated that more system in the study of the corrosion problem in general was apparent now than formerly and that had this been the case ten years ago the results would have been much more beneficial.

It being demonstrated and acknowledged that water and oxygen are the important factors in corrosion, it is wise to remove the oxygen from the water when possible and this has constituted the author's work. He gave practical illustrations of "deactivating" apparatus for removing the oxygen in various hot water systems and spoke of some of the unusual beneficial results obtained. In some cases the adoption of such a scheme has caused old rust in old pipes to gradually disappear so that the water pressure became again almost equal to that in the original system. In emphasizing the role of scale in the rusting of pipe, Mr. Speller threw on the screen views of extensive scale removing machinery, devised and installed by his company, for treating its product, an investment which he considered justified in the results obtained as to surface conditions and the ultimate corrosion as well as to the better galvanizing possible.

As to deactivating cold water, Mr. Speller said this was possible by the use of vacuum chambers and spraying the water. In Australia this has been accompanied in a 30-in. pipe line 300 miles long where the oxygen had reduced 80 per cent.

Boiler tube corrosion was introduced by a paper "Unusual Boiler Tube Corrosion by Carbon Dioxide," presented in abstract by the author, B. G. Worth, vice president Walter Kidde & Co., Inc., New York. He said in part:—

A steam boiler corroded rapidly and resisted all attempts to protect it electrolytically. Finally the trouble was located as due to soluble iron bicarbonate in the water used which gave off larger quantities of carbonic acid gas when heated in the boiler. The water was then treated by being kept at the boiling point 8 hr. in a preheater where the carbonic acid gas was liberated and a sludge of ferric hydroxide precipitated. The trouble then ceased.

"Observations on the Corrosion of Iron and Steel," by J. A. Aupperle and D. M. Strickland, both connected with the American Rolling Mill Co., Middletown, Ohio, was presented in abstract by the former. It dealt only with acid corrosion. In brief it presented a record of tests on pure iron made in open-hearth furnaces, copper iron, plain steel and copper steel to determine their resistance to corrosion by sulphuric acid. The specimen sheets were tested 60 days in each case either alone and

fastened to sheets of pure iron by copper and iron rivets forming galvanic couples. In all cases cited pure iron made in open-hearth furnaces had the smallest corrosion.

The chairman called attention to the distinct field of acid corrosion in which this paper lies as contrasted with atmospheric and other phases. Professor Richards cited the fact that the author, by riveting iron with other metals, had introduced new conditions as important factors.

Corrosion in Steel Ranges.

A paper, "The Corrosion of Steel Ranges," by Oliver W. Storey, metallurgical engineer C. F. Burgess laboratories, Madison, Wis., in the absence of the author was presented in abstract by Edwin F. Cone, THE IRON AGE, New York. The paper falls under the classification of atmospheric corrosion containing acids or carbonic oxide but other conditions enter in which make the contribution interesting. The author's conclusions put the facts of the case concisely as follows:

From the results obtained in this work it is apparent that the corrosion data obtained in atmospheric tests cannot be applied to the conditions present in ranges. A steel range presents a multiciplicity of problems in corrosion and the results obtained at one point cannot be applied to other parts of the range. Each portion of the range requires a separate study for the elimination of corrosion which is the chief factor in its ultimate destruction. It has been shown that high-copper steels are especially resistant to the combined action of the products of combustion and the alternate heating and cooling of a range. The results obtained under these conditions should be applicable to other situations where there are similar conditions.

The indications also are that the ultimate solution of the problem lies in the use of alloy steels or possibly other alloys, combined with protective methods such as Bauer-Barfling and vitreous enameling and by improvements in design. The use of an alloy costing considerably more than plain steel is justified at certain places in a range where there is excessive corrosion. This field, which has been almost untouched by investigators, should offer many possibilities to ferrous and non-ferrous alloys.

Stainless Steels

A division of the symposium which embraced certain steel rustless alloys and phenomena of non-ferrous corrosion constituted part of the program of the Friday session. On the former subject Oliver P. Watts, associate professor chemical engineering, University of Wisconsin, Madison, Wis., wrote a paper, "Principles of Alloying to Resist Corrosion," a brief abstract of which follows:

The paper is a plea for intelligent use of metallography and metallurgical principles in attempts to find non-corrodible alloys. The general principle is laid down that the less corrodible alloys are either metallic compounds of simple chemical formula (which are apt, however, to lack malleability) or solid solutions of the more resistant metals in each other. The protective action of small amounts of one metal in another are described; an interesting test proving the protective action of copper in steel is given.

H. S. Rawdon, physicist United States Bureau of Standards, Washington, in discussing this paper, said that he had investigated many types of stainless steels and had found that in certain of the chromium steels there were large amounts of carbide while in some of the higher nickel steels there were solid solutions. D. M. Strickland, American Rolling Mill Co., stated that some of his work had afforded results contradicting and in some cases agreeing with the author's general premises as to solid solutions being a concomitant of anti-corrosion properties.

Non-Ferrous Corrosion

Three papers in particular were submitted treating of the non-ferrous corrosion phase of the symposium. The first had to do with Monel metal. It was entitled "A Practical Aspect of the Corrosion Problem" by Dr. John F. Thompson, manager technical department, International Nickel Co., who offered an abstract in person. Proceeding on the thesis that the use of any metal or alloy is rarely based upon the sole property of resistance to corrosion, he enumerated the various anti-corrosive properties of this alloy under varying conditions and mentioned the fact frequently that it supplied the need of a white alloy, which looks like steel, as a substitute.

"Some Types of Non-Ferrous Corrosion" was the title of a paper by Henry S. Rawdon, United States Bureau of Standards, which he presented by means of stereopticon slides. The paper deals with cases of interior corrosion of certain brasses, Muntz metal particularly, where in many cases a de-zincification takes place resulting in a breaking down of the alloy.

Dr. Fink, the chairman, called special attention to the value of this contribution to this phase of corrosion and F. N. Speller, National Tube Co., Pittsburgh, testified that in the cases of brass hot water pipes, oxygen in the water had a similar effect to that on iron pipes which could be neutralized in a similar manner in most cases to that described by him in his own paper of the day before.

The third paper on this subject was "'Electrolytic Corrosion of Lead by Continuous and Periodic Currents" by E. R. Shepard, electrical engineer Bureau of Standards.

Summary of the Symposium

A summary of the symposium was read by Dr. Fink at the conclusion which concisely presented the main points brought out, at least in his opinion, Dr. Fink having been responsible for the program of this symposium as well as for two others previously held by the society. His summary was about as follows as to the points established:

1. That iron or steel containing about 0.25 per cent copper is anti-corrosive under most atmospheric conditions.
2. That iron or steel containing about 0.25 per cent copper when immersed in tap water or acidulated media does not endure as well as commercially pure iron.
3. Oxygen in boiler or hot water systems accelerates corrosion but this influence is removable by extracting the oxygen.
4. Corrosion is caused by carbon dioxide in boiler water containing soluble iron but this condition can be corrected.
5. Chromium, nickel and silicon added to iron tend to reduce corrosion.
6. Special steel and other alloys reduce corrosion possibilities but a co-ordination of results is still lacking.

The special investigations still needed, in Dr. Fink's opinion, comprise a study of surface films, their composition, porosity, tenacity to adhere; the microstructure at the metal's surface and underneath; the important problem of passivity of metals; alloy steels, their composition and films; a better classification of corrosion phenomena and a standardization of measurements of corrosion results.

Electric Furnaces, Electric Welding and Other Subjects

Electric arc welding, as an electrothermic problem, was introduced into the program by a paper at Friday's session, "Phenomena of Arc Welding" by O. H. Eschholz, research engineer Westinghouse Electric & Mfg. Co., East Pittsburgh. A brief abstract follows:

A detailed discussion of metal deposition, fusion and arc stability during electric welding is the main theme Under the first item, there are discussed the function of transport of metal by molecular forces, effect of evolution of gases, and vaporization or condensation, with the conclusion that the molecular forces play the main part. Under fusion are considered the effects of impact of ions, atmospheric convection currents, sudden liberation of gases, and combination of material with oxygen and nitrogen. Arc stability is discussed from the standpoints of long and short arcs, constant potential circuits, use of ballast resistance, etc.

J. A. Seede, electrical engineer General Electric Co., Schenectady, N. Y., in discussing the paper stated that the operator is perhaps the most important factor in securing proper results but that an automatic arc welder is now available which insures a perfect weld.

Non-Ferrous Electric Furnaces

Four papers were scheduled which had to do particularly with electric melting furnaces, principally in the non-ferrous field.

"Electro Dynamic Forces in Electric Furnaces" by

Dr. Carl Hering, consulting electrical engineer, Philadelphia, presented in abstract by the author, brought up the old controversy of patents which was emphasized by a written discussion by G. H. Clamer, vice-president Ajax Metal Co., Philadelphia. Dr. Hering's paper is a discussion of the pinch effect with special reference to what is characterized as the "stretch effect" and of the "corner effect," known also as "motor effect." The author emphasized the desirability of using electric force for agitating the hot metal instead of stirring by hand or by a revolving furnace. 'He "believes it can be shown that there is a broad general law which corresponds with a similar general mechanical principle and which applies to all electric circuits that well justify all these various new and old motions as also any others that may yet be discovered."

The paper, "Recent Progress in High Frequency Induction Heating," by E. F. Northrup, vice-president Ajax Electrochemic Corporation, Trenton, N. J., was presented in abstract by the author. It is an illuminating recital of the present status of such furnaces for experimental laboratories and commercial work, as well as a description of the high-frequency converter sets made for use with them. Seven types of furnaces are described in detail with actual performances. The largest one referred to takes 60 kw. and can melt 600 lb. of silver. An abstract will be published in a later issue of THE IRON AGE.

A discussion of the special work done in lining small graphite crucibles with alundum and other preparations to make them successfully withstand the high temperature and other conditions was participated in by the author and several other members.

The non-ferrous electric melting industry was represented also by a paper by H. W. Gillett, United States Bureau of Mines, Ithaca, N. Y., who was not present. The paper, "Electric Furnaces for Non-Ferrous Alloys" was not formally presented or discussed. It tabulates in detail all the electric furnaces operating on Jan. 1, 1921, in the United States melting non-ferrous metals, giving the kind of furnace, users, capacity per heat, etc. The author states there are 323 in 144 different plants with a capacity of 193 tons per single heat and using 42,350 kw. He also tabulates the composition of the alloys worked in the different furnaces and the special work for which each type of furnace is best adapted. The author discusses the construction, advantages and disadvantages of each type.

Electric Steel Furnaces

In the realm of large electric steel furnaces, W. G. Mylius, electric furnace engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, presented a brief resume of his paper, "Regulation of Electric Steel Arc Furnaces Using Movable Electrodes." The paper is a discussion of the difficulties of operating arc furnaces for melting steel, particularly when melting cold scrap, and of the kinds of arc current regulators which have been devised to maintain some function of the power input constant, such as current, voltage, watts or a combination of these. Difficulties caused by the weight and inertia of the electrodes are considered and the phenomena of "hunting" is explained. A new form of electrode regulator is described and illustrated which, it is claimed, will operate with greater precision and at higher speeds than previous types and thus overcome the difficulties of hunting.

Electrolytic Nickel

A valuable paper on nickel, which may forecast important commercial possibilities, was offered by Charles P. Madsen, electrochemical engineer, New York. It records the discovery by the author that if cathodes in a nickel electrolytic bath are periodically lifted out of the bath, exposed to the air and reimmersed within a certain limiting time, the nickel deposit does not laminate but is greatly improved as regards freedom from pitting and mechanical properties. Automatic apparatus for lifting out the cathodes at proper intervals and keeping them out the proper time was devised, resulting in nickel of greater ductility and tensile strength than heretofore obtained. The deposit is said to have great malleability and surprising hardness by Brinell test, considering its high ductility.

Dr. John F. Thompson, International Nickel Co., asserted that electrolytic nickel is malleable and that the essential achievement of the author was not malleability but production of a metal free from holes or flaws.

Dr. J. W. Richards offered an interesting explanation in the hypothesis that, in removing the nickel from the bath the oxygen of the air is mechanically collected on the cathode which when reimmersed tends to eliminate the hydrogen constantly present and perhaps offset its harmful effect, if it has any, rendering the nickel more malleable and bestowing better properties on it.

Important Society Developments

Several important matters were settled at the general business meeting preceding the Friday morning program.

The announcement was made that the Electric Furnace Association had been absorbed by the American Electrochemical Society by the action of the board of directors and this was acquiesced in by the members. The Electric Furnace Association has formerly been an independent small organization which has met jointly with this large organization and with the American Foundrymen's Association. It will now constitute the nucleus of a new division of the electrochemists. In fact the plan is to divide up the electrochemical organization into various sections which will deal with particular subjects such as electric furnaces, corrosion, electric deposition and refining, similar to some other technical organizations. Each section will be responsible for its own program at stated meetings. An amendment to the constitution as adopted defines the scope of the society to include electrochemistry, electrometallurgy, electrothermics and other allied subjects. This will ultimately embrace electric heat treatment of any metal or alloy or any field where electricity is used as a source of heat.

The report of the secretary, Dr. J. W. Richards, showed that the organization has 2364 members and that in the last year $19,330 has been spent on publications alone. The society has $13,100 invested. In the past year 400 new members were registered. For this convention 38 papers were submitted of which 32 were accepted and five returned for revision, one being held temporarily.

The retiring president, W. S. Landis, American Cyanimid Co., New York, read an address, "Our Inventory." It was the casting of a balance sheet of electrochemists as a group. According to him the industry with which the society is associated represents on the North American continent an invested capital of something over $600,000,000, which may actually be upward of $1,000,000,000. As to location Mr. Landis drew a picture of America as a satisfactory abiding place for such an industry and society and, as to personnel, he pointed to the skill, activity and courage of the industry's engineers, despite its comparative youth.

New Officers and Next Meetings

New officers elected for the ensuing year were as follows:

President: Acheson Smith, Acheson Graphite Co., Niagara Falls, N. Y.

Vice-presidents: C. F. Burgess, Burgess Laboratories, Madison, Wis.; C. G. Schluederberg, Westinghouse Electric & Mfg. Co., Pittsburgh, and E. L. Crosby, Detroit Electric Furnace Co., Detroit.

Managers: Dr. Carl Hering, Philadelphia; J. V. N. Dorr, the Dorr Co., New York, and F. J. A. Fitzgerald, Fitzgerald Laboratories, Niagara Falls, N. Y.

Treasurer: Pedro G. Salom.

Secretary: Prof. Jos. W. Richards, Bethlehem, Pa.

The next convention or the regular fall meeting will be held at the Lake Placid Club, Lake Placid, N. Y. Two important topics for the program will be electric nonferrous metallurgy and electric refining and plating.

It was also determined that electric cast iron will be the subject of a symposium for the spring meeting of 1922.

A feature was a lecture Thursday evening by Dr. R. B. Moore, chief chemist U. S. Bureau of Mines, Washington, on "Helium and Other Rare Gases."

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.*, Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Cincinnati: Mercantile Library Building. Washington: 816 Fifteenth Street, N. W. San Francisco: 320 Market Street. London, England: 11 Haymarket, S.W. 1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 50 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879

Steel Prices and Consumption

In view of the particularly interesting developments in steel prices in the past few months, there has been a tendency to magnify the importance of the factor of price in determining the amount of consumption. The subject has been a very interesting one, with the return of the independents late in the old year to the Industrial Board schedule, then after a brief interval the inception of "cutting" by the independents, and later the advances by the independents and reductions by the United States Steel Corporation, so that most sellers are now quoting the same figures.

Not long ago many people were urging the steel producers, and particularly the United States Steel Corporation, to reduce prices, on the ground that reductions in price would stimulate business, while now the question is being asked whether the new prices are "low enough." Not a few observers are exhibiting what might even be called a captious spirit. Some insist that prices are not low enough and they are disposed to blame those responsible for present prices with retarding the recovery of business. Others are sensitive to any reference to the possibility of steel prices passing to still lower levels, and criticize those who make such references as being enemies to the establishment of confidence.

The disposition to base the prospective steel consumption upon the prices the steel mills charge is altogether too strong. We have had heavy consumption of steel when prices were very low, as in 1897 and 1898, and also when they were high, as in 1920. We have had light consumption when they were low, as in 1914, and when they were high, as in 1908.

Another point to be considered in trying to gage the effect of steel prices on consumption is that the public buys very little steel. The mills sell rails directly into consumption, but there is no other conspicuous case of such selling. A few commodities pass directly into consumption through dealers, such as nails and barb wire; but the great bulk of the steel that is sold by the mills passes to what are known as "manufacturing consumers." These manufacturers make a very wide variety of products—freight cars, automobiles, stoves, tools, hardware and machinery of many descriptions for use in factories, machine shops and on the farm.

Such manufacturers as a rule do not make up stocks long in advance, and they certainly are indisposed to do so at the present time, when their costs, apart from the item of the cost of steel, are tending to decrease. They will buy steel, therefore, only as they sell their finished wares, and the public is a very poor buyer just now. If it is a matter of price, as some commentators on the situation maintain, they should ascertain and consider the prices the ultimate consumer is being asked to pay. It is very far from being an established fact that the prices the ultimate consumer is asked for these various wares into which steel enters are low enough in view of the prices for the raw materials now being asked by the steel mills.

The other large outlet of the steel mills is in what may be broadly called construction work, in the erection of bridges and buildings, factories and power plants, transmission lines and pipe lines, in the opening of oil wells, the opening or improvement of mines. In all such work, as a whole, the price that is paid to the steel mill for steel is not the basic or principal factor. An inordinately high price for steel would be a deterrent, but other considerations enter, and there must be practically unanimous consent in all quarters before the new project is undertaken. All the important construction commodities must be at satisfactory prices, wage rates and conditions of labor must be agreeable to the investor, capital must be available (just now it is high priced), and there must be a reasonable prospect that the investment will begin earning money soon after the work is completed. There are many important factors, steel being simply one. In the language of the street, "Why jump on steel?" It can give a better account of itself than can many other things.

The point is, not that steel will not go lower, nor that the prices now asked represent any peculiar ability of the makers to arrive at the right price; but rather that some of those who have so freely advised the steel industry to cut its prices have exaggerated ideas both as to what the steel industry can stand in that direction and as to the

effect price cuts would have, at this stage of the general readjustment, in stimulating demand.

Union and Non-Union Workers

Counting out of the reckoning imports and exports, there is a certain sum total of work done in the country in the manufacture of goods and in rendering transportation and other service. This is done by the people as a whole, and the people as a whole receive also the goods and services.

The work to be done by the individual in making up the sum total should be apportioned to his ability. Having received payment, the worker is in position to purchase goods or service. The work he performs and what he receives should be in proportion. If now the worker receives more for his services than is rightly due for a full day's service, or if he does less than a proper day's work, yet receives payment equal to a proper day's work, from whence is the extra amount secured?

As matters now stand, the majority of members of unions do receive greater pay in proportion to the service rendered than is the average in the whole body of society. From what source is the extra collection made? Of the total number of workers in the country from 10 to 15 per cent are union, the remainder being non-union. The matter resolves itself into a question whether the extra payment is collected from "capital" or from the whole body of workers.

The common attitude of labor leaders is that they collect the extra money—for they could not hold their jobs if they did not insist that they do secure extra money for their proteges—from the profits of capital, there being such profits that it is feasible to subtract a heavy toll and still leave enough to justify the business continuing.

Is this so? Is there really room for such withdrawals from the profits of capital, or must the extra payment, when the employee gets more than the service he renders would accord him, be taken really from the whole body of people? It is a matter of proportion between the profits of capital and the incomes of those who work.

Very largely the "wealth" of the country reported by the Bureau of the Census represents the capital. Since the census of 1900 the law requires that the wealth be reported in a non-census year. The last report was for 1912, while the next will be for the year 1923. The reports show $107,104,211,917 for 1904 and $187,739,071,090 for 1912. By extrapolation the figure for 1921 would be $353,000,000,000, but clothing, household goods, church property, etc., are all included. It would seem liberal to take the capital at 300 billions. A check on this figure is the fact that the railroads are capitalized and are valued at a trifle less than 20 billions. A 10 per cent return on the capital would be a liberal estimate, making 30 billions a year. What appears to be a fair approximation of the total wages and salaries paid is 100 billions a year.

Here, then, is a proportion of 10 to 3. The real proportion is more likely to be 4 to 1 or 5 to 1 than 3 to 1. If, then, a man receives more pay than he should, or does less work than he should, he would, perforce, have to collect at least two-thirds, probably much more, of the extra amount from the workers as a body, even if he took the entire margin of capital.

The people, in other words, must pay. When union workers receive in groceries, clothing, personal service and other things more than they are entitled to get in relation to the depreciated service they render by shortened hours, slack performance, multiplication of jobs, employment of unnecessary helpers and the whole category of union inefficiencies, they are living to that extent chiefly off the 85 or 90 per cent of the workers who are not organized. They are not getting the extra amount from the profits of capital. If 100 per cent of the workers endeavored to do this there would simply be industrial decay.

Progress in Corrosion Research

That distinct progress has been made in the study of the important problem of the corrosion of iron and steel, the extensive symposium of American electrochemists last week at Atlantic City gave proof. Abstracts of important papers and vital points in the discussions are reported elsewhere. Every phase, from commercially pure iron and copper-bearing steel up to the new stainless steels and alloys, was presented by men who have made a life study of the problem. Corrosion being due to electrolytic action, its study has fallen by right into the province of the American Electrochemical Society, which is now credited with three noteworthy symposiums, the second coming in 1915 and the first a few years earlier.

In the latest symposium there was perhaps less of commercial controversy and more of the scientific spirit of fair judgment than formerly. On a number of occasions there has been too much insistence by certain groups upon the superiority of their particular product and an unwillingness to see merit in the work of others. But out of all the conflict and contradiction some things are taking shape. For example, it seems now fairly well established, as expressed by Dr. C. G. Fink, who has successfully managed these symposiums, that copper-bearing steel withstands atmospheric corrosion, whereas the same steel immersed in tap water or under acid conditions does not resist corrosive influences as well as commercially pure iron.

Emphasis was put on the valuable work of an investigator who has demonstrated that where the removal of dissolved oxygen from water is possible there is almost complete prevention of the corrosion of water pipes—a discovery that is one of the most practical benefits realized from the study of this problem.

In respect to stainless and non-corrodible steels and alloys it is evident that only a beginning has been made. The theory that the behavior of some of these steels is due to solid solutions of the alloying metals was offered by one author, but further evidence will be needed to secure its acceptance. It is quite probable that special alloy steels

will contribute in an important way to the solution of the corrosion problem.

The vast economic waste due to corrosive action will continue to be a stimulus to investigation. All that has been spent in research so far has yielded large returns, but much is yet to be done and the investigation must be better systematized. There is need, for example, of thorough investigation of the film theory, as well as of the rôle of microstructure resulting either from heat treatment or mechanical working. Certainly those who took part in last week's discussion carried away a better appreciation of the lines on which future work must be done and a new enthusiasm in view of the important contributions of this noteworthy meeting.

More Railroad Economics

We have called attention from time to time to the now familiar process of throttling the railroads by inequitable wage schedules fastened on them under Government control. Chairman L. F. Loree of the Kansas City Southern Railway Co., in a letter to the stockholders of that company, cites specific instances of excessive labor cost. Here is one:

> On one of our branch lines we run a passenger train making two round trips each day. On this train we employ a colored porter, who also acts as a brakeman. In 1909 we were paying this employee $44.80 per month. In 1914 we were paying him $47.80 per month. Due to the various changes made by the Director General and continued by the United States Railroad Labor Board we paid him in
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> | | |
> |---|---|
> | November, 1920 | $266.71 |
> | December, 1920 | 281.07 |
> | January, 1921 | 271.89 |
> | February, 1921 | 237.83 |
>
> He could readily be replaced at $75 per month, were we freed from the shackles of the laws which fix both conditions of employment and rates of pay.

Another lesson in railroad economics is a *Railway Age* editorial starting with the fact that cabbages worth to the producer in Texas, on April 16, $7 a ton, cost to ship to Chicago (including freight tariff, icing and federal tax) $26.30 a ton. On the same date cabbages sold at retail in Chicago for $140 a ton. The *Railway Age* holds up the Texas cabbages and its price in the Chicago market as proof that the commission merchants are among the most remorseless profiteers in the country. The New York *Herald* points out that the transportation costs cited, which are so out of proportion to the value of a ton of cabbages in Texas, are almost entirely labor charges. At the same time it suggests that the handling charges at Chicago largely resolve themselves into labor costs; that "back of the commission men are the jobbers with their labor costs, the wholesalers with their labor costs and the retailers with their labor costs, including delivery costs and rents largely determined by labor charges for building."

What stands out in the case of the Texas cabbages in the Chicago market is what appears from an analysis of any manufacturing or transportation or merchandising cost, namely, that war-inflated labor costs are the main cause of high living cost. The case stated by Chairman Loree is one of many representing "feather bed" practices, "punitive overtime" and other allowances, which, he says, have involved his company in an expense in excess of $1,250,000 annually—an expense for which there is no economic justification.

The steel industry is suffering with every other industry from excess railroad charges. Freight charges on the raw material entering into a ton of finished steel range from $12.50 to $14.50 in Pennsylvania, which in the case of steel bars represents 27 to 31 per cent of the present market price per gross ton. Not many years back a ton of steel billets could be transported from Birmingham, Ala., and loaded on vessel at Mobile for $1. To-day the charge for this service is $4.19.

The readjustments now under way in industry quickly reach their limits, so long as this levy of railroad labor upon the entire business of the country is allowed to go on. The real deflation problem is still the problem of railroad deflation.

Great Britain has suffered a sharp backset as a pig iron exporting nation. In 1912 and 1913 British pig iron exports were 105,200 tons and 93,700 tons per month respectively, or nearly four times those of the United States in 1913. In 1919 British exports of pig iron were 29,700 tons per month, advancing to 48,250 tons per month in 1920, or to about 50 per cent of the pre-war movement. This year the decline has been still more pronounced, January and February exports being only 20,100 tons and 14,000 tons respectively, or a little over one-fifth of the rate in 1913.

CORRESPONDENCE

Unsoundness and Segregation in Rail Ingots

To the Editor: In your editorial on "Unsound Ingots and Unsafe Rails" appearing in your issue of April 14, you have emphasized only one side of the problem of ingot defects, or the question of unsoundness. The statement that you quoted from the convention of the American Railway Engineering Association, however, mentioned two factors in this connection of equal importance, namely, segregation and unsoundness.

While the use of a mold with large end up, supplemented with the hot-top, is undoubtedly effective in producing sounder steel, it is of no value in reducing segregation. Investigations by the Interstate Commerce Commission and others have shown that a frequent cause, if not the main cause, of split heads in rails is segregated steel, which may be perfectly sound, but too brittle at certain points to stand the shocks and alternating stresses of service. It is extremely doubtful if Professor Moore, in discussing drill steel failures, had any intention of maintaining that rail failures all came from unsoundness rather than segregation. This deduction that you have made from his remarks appears quite unwarranted, and I am very sure that Professor Moore himself would not defend that statement.

On the other hand, many railroad engineers of prominence agree that tests have shown segregation to be of prime importance as a cause for rail failures.

Additional proof of this is found in the rail report bulletins published by the Titanium Alloy Mfg. Co. In Bulletin No. 8 are shown sulphur prints and chemical analyses of several hundred rails, proving that titanium-treated rails are very much more free from segregation than the usual untreated product of our rail mills.

In Bulletin No. 9 service data on these same rails after four or five years in track are quoted from reports of the American Railway Engineering Association, which show that the homogeneous titanium-treated rails, free from segregation, developed less than half as many failures per given mileage as the ordinary rails developed in the same time. Thus the effect of eliminating badly segregated rails was found to be a reduction of rail failures by half.

While sound ingots are undoubtedly necessary for making good steel rails, it should also be emphasized with equal force that homogeneous metal free from excessive segregation is of even more importance for this purpose. And the surest way so far developed and proved for attaining this quality of steel is to deoxidize and clean the metal in the ladle with ferro carbon-titanium.

GEORGE F. COMSTOCK,
Metallurgical engineer Titanium Alloy Mfg. Co.
Niagara Falls, N. Y., April 22.

[NOTE.—Our correspondent is in error in finding in the editorial in question any "deduction" from Professor Moore's remarks that "rail failures all come from unsoundness *rather than* segregation." The word unsoundness was used broadly, and the intent, which we assumed was evident, was to point out that "failures are largely due to defects in the original steel." This statement was in line with the general tenor of Professor Moore's comment previously quoted—that as far as his research on fatigue in drill steel had gone, there was no case of failure under repeated stress which could not be explained as originating in some defect in the steel.—Editor THE IRON AGE.]

An Appeal from Korea

To the Editor: An unusual opportunity is offered to members of the machine tool industry to come in contact with the future industrial leaders of Korea. An established college is now installing a model machine shop for training efficient Korean young men in tool making and modern machine practice. These young men will be the future mechanical engineers and teachers in their land. This college is known as the "Chosen Christian College" and is operated by a union board composed of members of nearly all of the missions working in Korea and is interdenominational in its character.

Machinery of all kinds is needed in the country but trained engineers, superintendents or teachers are lacking and we feel that it is our privilege to bring this practical experience to these young men under healthful Christian, stimulating influence. Those interested may get from us a list of the things we feel we need.

A. E. LUCAS,
Chosen Christian College.
150 Fifth Avenue, New York.

Scherbius Mill Motor Drive

To the Editor: Will you kindly refer to the article titled "Flexibility of Output Assured in Scullin Mills" which appears in your March 31 issue. On page 833, the statement is made that the principal criticism of the Scherbius type of control is that the torque is constant at all speeds, etc. Apparently the author of this article was not conversant with the Scherbius scheme, as there are two types of Scherbius control; namely, one involving a motor generator consisting of a commutator motor which receives its power from the slip rings of the main induction motor and which drives an induction generator which delivers power back into the system, and the other scheme comprising a commutator motor direct connected to the main driving motor and receiving its power from the slip rings of the main driving motor. With the second scheme, the output of the main driving motor is strictly constant horsepower, whereas with the first scheme, the output of the main driving motor may be either constant horsepower or constant torque, depending upon the design of the motor.

The General Electric Co. holds patent rights in this country on the Scherbius system, which, of course, prevents other electrical manufacturers from supplying these schemes. The General Electric Co., however, is in a position to furnish the Kraemer system. It is, of course, our policy to recommend the system best suited for the particular application. In general, it has been found that the first scheme mentioned above meets, by far, the greater number of adjustable rolling mill problems. This is evidenced by the fact that the General Electric Co. has furnished over two-thirds of all alternating current adjustable speed drives in capacities of 300 hp. and greater, utilizing in almost all instances the first mentioned scheme.

We feel that the above mentioned statement, on page 833 of your March 31 issue, does us considerable injustice and know that you would be glad to correct this statement in your next issue.

J. E. N. HUME,
Power and Mining Department,
General Electric Co.
Schenectady, N. Y., April 14.

A Time for Close Reading of The Iron Age

At no time in all its 66 years of unique service to the iron and metalworking industries have the readers of THE IRON AGE expected so much from it as they are expecting to-day, and at no time has THE IRON AGE spent anything like as much money and effort to get for its readers what they want to know.

Our market reports were never so well read. Manufacturers are buying only for immediate needs. The situation growing out of the two years' variations between Steel Corporation and independent prices will bear watching.

THE IRON AGE'S editorial discussion of the economic readjustments forced by the war have been widely read and quoted and have been a leading feature of the paper for the past two years.

It is nearly 30 months since the Armistice, but the Old World is far short of its pre-war production of steel, and will continue short for many months more. IRON AGE correspondents in Great Britain, France, Germany, Belgium and Italy give the latest developments in international competition in steel.

Washington industrial and economic news is highly important. Will the new administration show the way to business prosperity? A correspondent who watches the bearings of every development there on the iron and metal trades is working every week for IRON AGE readers.

Manufacturing costs are being worked down so that selling prices can be brought as near as possible to those before the war. The labor and management pages of THE IRON AGE are full of information on this whole situation. Technical men are improving practice in steel-making and steel-using and the record of it is in THE IRON AGE.

Our own staff in the leading cities and special correspondents in others give each week all the available news of new construction and plant additions and other opportunities for business. It is surprising how much they dig up each week, and IRON AGE readers get all the benefit of it.

What a time of all times for reading "The World's Greatest Industrial Paper"! We are glad our subscribers see it that way. We regard our high percentage of renewals as fine proof of confidence.

Sharp Decline in Iron and Steel Exports

Movement to Foreign Countries in March Much Below That of February — Imports Increase — Canada and the Far East Prominent Among Buyers

WASHINGTON, April 26.
THE IRON AGE BUREAU,
816 Fifteenth Street.

EXPORTS of iron and steel for March showed a sharp decline, as was to be expected, as compared with the February figures, the total being 230,635 gross tons and 393,328 tons, respectively. While imports were small, it is rather surprising to observe they showed an increase over the February figures, the total being 5323 tons and 4446 tons, respectively. For the nine-month period ending with the past month, iron and steel exports showed an increase of a little more than 1,000,000 tons when compared with the corresponding period of last year, the totals being 4,107,616 tons and 3,003,747 tons.

Imports reveal a reverse situation. For the nine-month period ending with March of this year, they total 212,918 tons, while for the corresponding period of last year they were 336,819 tons. The value of iron and steel exports listed in THE IRON AGE table for the nine-month period ending with March of this year was $907,121,914, as compared with $656,839,516 for the corresponding period of last year.

While the March, 1921, exports were 186,581 tons less than they were in March 1920, the total values for the two periods were $67,870,739 for March, compared with $94,784,845 for March of last year.

Imports of March, 1921, were valued at $2,835,363, and for the nine-month period ending with that month at $35,799,830.

Exports of Iron and Steel

	Gross Tons			
			Nine Months Ending	
	March 1920	March 1921	March 1920	March 1921
Ferromanganese	75	20	1,959	3,117
Ferrosilicon	....	....	333	523
Pig iron	22,740	2,320	202,218	120,217
Scrap	3,221	3,929	32,396	172,083
Bar iron	4,712	1,048	26,558	38,217
Wire rods	10,636	1,073	75,389	57,031
Steel bars	58,862	18,120	417,982	452,554
Billets, ingots, blooms	30,444	1,023	223,553	80,016
Bolts and nuts	4,394	2,617	24,283	33,114
Hoops and bands	6,009	1,939	31,197	35,174
Horseshoes	167	48	1,940	1,389
Cut nails	9	41	975	3,395
Wire nails	223	1,421	43,575	71,241
All other nails, including tacks	877	278	6,825	9,021
Cast pipe and fittings	4,976	3,982	31,807	63,516
Welded pipe and fittings	25,202	34,416	154,079	337,035
Radiators and cast house boilers	604	146	5,461	4,218
Railroad spikes	1,792	962	12,441	12,330
Steel rails	51,763	48,127	399,379	479,950
Galvanized sheets and plates	10,586	7,176	71,175	82,998
All other sheets and plates	4,338	1,225	26,228	21,639
Steel plates	74,468	44,627	509,313	705,760
Steel sheets	12,730	5,800	105,925	130,666
Ship plates, punched and shaped	4,715	209	16,315	308,186
Structural steel	38,463	37,988	235,624	470,784
Tin and terne plates	21,498	5,688	146,208	170,576
Barb wire	13,507	799	86,246	83,183
All other wire	10,205	5,613	114,365	159,682
Total	417,216	230,635	3,003,747	4,107,616

Exports, January, 1919, to March, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Total	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Total	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023

Imports of Iron and Steel

	Gross Tons			
			Nine Months Ending	
	March 1920	March 1921	March 1920	March 1921
Ferromanganese	2,860	790	26,280	40,742
Ferrosilicon	2,251	202	13,187	6,568
Pig iron	11,423	829	88,824	42,411
Scrap	17,500	2,174	176,287	79,177
Bar iron	935	64	2,462	3,458
Structural steel	47	83	822	1,175
Billets without alloys	2,137	....	19,169	746
All other steel billets	....	126	....	2,920
Steel rails	454	12	7,827	28,446
Sheets and plates	135	718	990	2,372
Tin and terne plates	38	89	283	384
Wire rods	179	236	688	4,516
Total	37,959	5,323	336,819	212,918
Manganese ore and oxide	18,970	69,710	151,098	563,678

Machinery Exports.

	March 1920	March 1921	Nine Months Ending March 1920	Nine Months Ending March 1921
Adding machines	$ 528,231	$ 231,841	$ 2,711,444	$ 5,309,674
Air-compressing machinery	557,155	459,409	2,897,518	4,871,284
Brewers machinery	64,502	8,852	221,588	398,833
Cash registers	733,951	184,654	3,801,061	3,234,813
Parts of	42,187	34,600	248,519	314,138
Concrete mixers	95,699	70,489	315,378	914,476
Cotton gins	54,517	7,192	155,833	258,775
Cream separators	89,143	31,657	806,792	661,217
Elevators and elevator machinery	92,244	107,553	1,466,949	1,611,792
Electric locomotives	62,406	4,400	872,153	266,972
Gas engines, stationary	86,768	37,773	589,949	537,889
Gasoline engines	3,648,148	874,611	22,222,022	21,661,889
Kerosene engines	2,709,981	750,094	6,937,375	8,389,050
Steam engines	3,835,390	5,429,238	30,311,156	41,061,817
All other engines	187,207	198,779	1,942,315	3,336,291
Boilers	697,127	782,244	4,943,509	8,063,869
Boiler tubes	365,386	321,029	3,191,197	6,001,213
All other parts of engines	1,596,274	1,561,148	16,504,290	17,784,782
Excavating machinery	408,180	97,139	1,120,201	2,008,056
Milling machinery, flour and grist	150,688	123,572	1,065,042	1,809,862
Laundry machinery	105,276	107,533	783,482	886,801
All other	53,714	58,455	331,114	771,246
Lawn mowers	50,797	78,229	268,616	487,616
Lathes	1,079,793	337,856	6,679,494	4,639,101
Other machine tools	1,943,230	528,563	9,275,127	9,159,515
Sharpening and grinding machines	475,248	95,645	3,365,749	2,348,870
All other metal working machinery	1,652,604	1,359,489	18,246,387	13,473,329
Meters, gas and water	72,917	30,170	525,164	610,738
Mining machinery, oil well	657,686	1,288,018	2,909,395	8,821,733
All other	1,158,571	760,452	6,575,381	7,835,804
Paper mill machinery	251,601	352,959	2,150,752	3,043,010
Printing presses	617,005	938,824	4,227,238	8,573,573
Pumps and pumping machinery	1,083,365	1,293,318	7,215,105	13,876,082
Refrigerating and ice making machinery	267,894	227,246	1,595,805	3,019,078
Road making machinery	120,331	107,865	770,164	879,000
Sewing machines	1,767,319	579,740	10,262,006	9,599,726
Shoe machinery	201,309	213,782	2,098,189	2,455,762
Sugar mill machinery	803,884	1,642,857	12,036,166	25,378,028
Textile machinery	1,380,622	11,461,776	10,779,931	19,594,856
Typesetting machines	669,485	278,075	2,681,086	3,797,009
Typewriting machines	2,624,012	1,058,875	14,723,816	16,659,150
Windmills	219,091	234,944	929,039	2,422,937
Woodworking machinery, saw mill	159,574	128,448	638,792	1,140,019
All other	705,899	320,079	2,571,619	2,360,752
All other machinery and parts of	8,155,004	8,274,473	56,151,760	83,541,493
Totals	$42,281,415	$43,073,945	$278,190,668	$374,871,920

Machinery exports for March showed an increase of $792,530 over those of February, the totals being $43,073,945 and $42,281,415 respectively. For the nine-month period ending March 31 of this year there was shown a sharp increase over the same period of last year, the respective figures being $374,871,920 and $278,190,668.

The biggest item of exportation last month in the iron and steel list was steel rails, the total being 48,127 tons. The largest single point of exportation of rails was Brazil, which took 7298 tons for the month, and 49,437 tons for the nine-month period. Kwantung ranked second, taking 5898 tons in March and 11,030 tons for the nine-month period. Cuba took 1626 tons and 75,267 tons, respectively, while the Dutch East Indies took 1433 tons and 44,412 tons.

Exportations of steel plates for March totaled 44,627 tons, the biggest buyer being Canada, which took 8875 tons for the month and 166,104 tons for the nine months. Other foreign buyers for these periods and the tonnage they took were: Japan, 6434 tons and 70,783 tons; Italy, 7236 tons and 41,436 tons and the United Kingdom 4348 tons and 129,574 tons. Of the welded pipe exportations of 34,416 tons for March and 337,035 tons for the nine-month period, the principal buyers were Mexico, 11,535 tons and 127,742 tons; British India, 3640 tons and 28,459 tons; United Kingdom, 2224 tons and 12,128 tons; Cuba, 498 and 16,952 tons.

Structural steel exports of 37,988 tons for March and 470,784 tons for the nine-month period went principally to Canada, Japan, British India and Cuba.

Of the total values of metal working machinery aggregating $2,231,553 for March and $29,620,814 for the nine-month period, the chief countries of consumption were France, United Kingdom, Canada, Belgium, Brazil and Japan.

FOUNDRY WAGE REDUCTION

New Piece Rates for Stove Molders Are 15 Per Cent Lower

After a conference lasting two weeks, an agreement was reached in New York on April 24 between the executive committee of the International Molders' Union and the committee of the Stove Founders' National Defense Association on the basis of wages to prevail in the coming year in the stove foundries represented in the conference. The molders agreed to a reduction of 15 per cent in piece work rates, thereby recognizing the demands of the changed conditions in the foundry industry and other industries. The action is significant as being one of the first instances in which a national labor organization has agreed to a reduction in wages, apart from unions which have sliding scale agreements with employers. In the case of day labor, of which there is comparatively little in stove foundries, the conference changed the minimum from $6.32½ to $6. The settlement involved also a few changes in details of practice, including the arrangement for cutting sand.

The wage agreements which have been made over a period of years between the molders' union and the stove founders have been reckoned from the "straight board wage" which was set 22 years ago. Counting this base as 100, the various advances which have been made under the conference regime brought the rate of 1920, which was the high point, to 225. The reduction of 15 per cent from this high level brings the rate down to 191¼—that is, $1 according to the straight board wage is now $1.91¼.

Following the New York conference on stove foundry wages, the officers of the International Molders' Union and various district representatives of that union held a conference concerning the strikes now on in various machinery foundries throughout the country. Upwards of 60 strikes against wage reductions were ordered by the union in the past few months. It is to be expected, in view of the New York settlement on stove foundry wages, that reductions will be accepted by the machinery molders. Settlement of the various strikes, however, will be by arrangement either with local organizations of foundrymen or with individual foundries.

At Newark, N. J., where the union molders went out early in March, striking against a reduction in wages from 88c. to 80c. per hr., the business agent of the molders now seeks to have the employers reinstate their men on the 80c. basis.

REORGANIZATION PLANS

Secretary Hoover Holds Conferences with Representative Business Men

WASHINGTON, April 26.—Development of plans looking to the reorganization of the Department of Commerce to bring it into its proper relationship with business interests and to serve its public purposes more efficiently was taken under discussion yesterday as they relate to the Bureau of Foreign and Domestic Commerce and will receive consideration on Friday of the present week as they relate to the entire department. The meeting which was begun yesterday, and which, like that of Friday, was called by Secretary of Commerce Hoover, was attended by men either formerly associated with the Department of Commerce or acquainted with the phases of the different questions involved. In addition to officials of the Bureau of Foreign and Domestic Commerce, there were present Walter S. Tower of the Consolidated Steel Corporation, New York; Chester Lloyd Jones, of C. Tennant Sons & Co., New York; Ralph Heilman, Northwestern University, Chicago; Julius Klein, graduate of the School of Business Administration, Harvard University; Horace Morrison, Philadelphia Chamber of Commerce; Allen A. Young, Harvard University; Wesley C. Mitchell, secretary Statistical Committee, New York; William G. Reid, Philadelphia; C. D. Snow, United States Chamber of Commerce, and A. W. Shaw, Chicago, voluntary aid to Mr. Hoover in organizing service committees.

Among those invited to attend the meeting Friday, are James A. Farrell, as president of the National Foreign Trade Council, New York; Alex Legge of the International Harvester Corporation; President Charles Piez, Link Belt Co., President Clarence M. Wooley, American Radiator Co., and Hamilton Stewart, vice-president Harbison-Walker Refractories Co. So far about 40 men have been invited.

It is the purpose of Mr. Hoover to have these men develop a precise program for reorganization of the Department of Commerce, so that it may be better organized and coordinated in the interest of the public and the business of the country. Recommendations for reorganization, along broad lines, have been made by Mr. Hoover in connection with a request for an appropriation made to the House Committee on Appropriations. The plans he has made will not involve any considerable expenditure, but it is claimed will greatly increase the service of the Department of Commerce.

Advisory committees selected by Mr. Hoover for the purpose of establishing closer contact between business interests and the Department are not to be made permanent as organized. While they will be maintained continuously, their personnel will be changed from time to time in order to select those possessing a special knowledge of the various subjects that are to be considered, chief among them being that of export trade. The department also will co-operate in this connection with other Government branches, a case in point being the world survey of the zinc markets. The Tariff Commission has experts studying this problem abroad also and the Geological Survey is studying the domestic situation and both bodies will be aided by the Department of Commerce.

Iron and Steel Markets

SENTIMENT IMPROVED

Better Demand from Automobile and Oil Trades

Reductions Expected in Machinery Foundry Wages—Export Rail Inquiries

Reports from steel trade centers indicate an improvement in sentiment, with a slight betterment in demand, represented by the belated appearance of spring business looked for in vain last month. Operations are little changed apart from some recovery from a low dip by the Steel Corporation last week. The average for the industry is somewhat under 40 per cent.

The larger working of automobile plants now gives signs of being more than the flurry it was first thought to be. A 50 per cent operation of independent sheet mills this week is credited in large part to automobile demand and there is a 4000-ton inquiry from the Ford Motor Co., chiefly for blue annealed sheets.

There is, furthermore, better promise of activity in oil. Twelve 80,000 barrel tanks for Wyoming call for 4500 tons of plates. The oil companies also have been buying tin plates this week on a larger scale, and the advance in Pennsylvania crude oil gives promise of increased drilling, with a better demand for oil country pipe than has seemed likely.

Finished steel prices are generally maintained at the figures announced two weeks ago, the few concessions reported being traceable to quotations made before the advance. A 2c. price on plates was made by one of the smaller mills.

Competition in concrete reinforcing bars promises to put the 2.10c. price for new steel to a severe test. Rerolling mills have not followed the recent advance of the large independent companies and some continue to quote hard bars at 1.90c. Of about 10,000 tons of active inquiry for concrete bars, half is for a Detroit project.

Though only 7½ days of the country's capacity for fabricating bridges and buildings were contracted for in March, and the total was over twice that of February, the six months ended with March gave more business in fabricated steel by over 14 per cent than the six months immediately succeeding the signing of the armistice.

Fabricated steel awards in large jobs total 11,000 tons, including 3100 tons of tank work, and fresh projects calling for 6500 tons have appeared, half of this being for railroad car construction and repairs.

Significant action bearing on the foundry situation is the acceptance of a 15 per cent reduction in stove molding rates by the International Molders' Union. This opens the way to the settlement of more than 60 strikes in machinery foundries, the molders' union in all these cases having refused to accept any reduction.

By the bi-monthly scale settlement just made at Youngstown, puddling wages are reduced from $15.02 to $13.76 per ton. The average price of bar iron in the 60 days ending April 20 was shown to be 2.55c., as against 2.80c. in the previous period. Puddling is now down $4.76 from the maximum rate of last year.

Rails are the only sizeable factor in the export trade. Three lots are up, with good prospects that the business will come to this country: 7000 tons for the Imperial Japanese Railways, 10,000 tons for the Argentine Government Railways and 11,000 tons for the Pekin & Mukden.

Makers in the Valleys have abandoned their policy of adhering to quotations of $27 and $25 respectively for Bessemer and basic, and are now awaiting the opening of negotiations by buyers. Meantime basic in the Valleys has declined 50c. on a sale of 5000 tons and a sale of 2000 tons of basic to a Harrisburg, Pa., consumer developed slight concessions. A Canton, Ohio, company which has been sounding the market for 10,000 tons has decided to start up its own furnace to make this iron.

Marked weakness has developed in the cast iron pipe market in the East on a sale of 500 tons made to Jersey City, but in the Central West prices are fairly well maintained. That municipalities are still hopeful of obtaining lower quotations is shown by the action of Detroit in rejecting bids on 20,600 tons on which only slight concessions had been made. For part of this work Detroit will now use 5000 tons of steel pipe.

The scrap market in some centers shows better demand, with somewhat higher quotations, but speculative considerations are a factor.

Cutting of prices has brought an open market on 50 per cent ferrosilicon, which can be had from first hands at $80 per ton, delivered.

Stocks of pig iron in Japan, if purchasers were available, could now be delivered on the Pacific Coast at about $31.50 per ton, or fully $6 per ton below what is asked for Alabama iron.

Galvanizers are inquiring for zinc more actively than in many months with the result of increased buying and a slightly higher price for the metal.

Estimates of Lake Superior ore shipments in the coming season are being revised downward. Whereas in March opinion at Cleveland leaned toward 35,000,000 or 40,000,000 tons, to-day's figures are 28,000,000 to 30,000,000 tons, as against a movement of 58,500,000 tons last year.

Pittsburgh

PITTSBURGH, April 26.

Sentiment shows some betterment, but outside the fact that the activity in the automobile industry now gives signs of being something more than a mere flurry, there is nothing tangible in the way of explanation for the more cheerful feeling. Exclusive of the Ford Motor Co., the automobile industry, according to local advices, is operating at about 50 per cent of capacity, and including the Ford Motor Co. it is esimated that the industry is averaging between 65 and 75 per cent of the 1920 gait. It was generally believed that the revival in the automobile industry would peter out by the end of the second quarter of the year, but recent advices from Detroit are to the effect that the Ford company already has made up its schedule for July.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 26, 1921	Apr. 19, 1921	Mar. 29, 1921	Apr. 27, 1920
No. 2X, Philadelphia‡	$26.26	$26.26	$27.26	$47.05
No. 2, Valley furnace†	24.50	24.50	25.00	43.00
No. 2 Southern, Cin'ti†	27.50	27.50	29.50	45.60
No. 2, Birmingham, Ala.†	23.00	23.00	25.00	42.00
No. 2 foundry, Chicago*	24.00	24.00	25.00	43.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	44.80
Basic, Valley furnace	*22.50*	23.00	23.00	43.00
Bessemer, Pittsburgh	*26.96*	26.96	26.96	43.90
Malleable, Chicago*	24.00	24.00	25.00	43.50
Malleable, Valley	25.00	25.00	25.00	43.00
Gray forge, Pittsburgh	25.46	25.46	25.96	42.40
L. S. charcoal, Chicago	38.50	38.50	38.50	57.50
Ferromanganese, del'v'd	90.00	90.00	90.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	37.00	37.00	38.00	60.00
O.-h. billets, Pittsburgh	37.00	37.00	38.50	60.00
O.-h. sheet bars, P'gh	39.00	39.00	38.00	80.00
Forging billets, base, P'gh.	42.00	42.00	43.50	80.00
O.-h. billets, Phila.	42.74	42.74	44.24	64.10
Wire rods, Pittsburgh	48.00	48.00	52.00	70.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	2.20	2.20	2.25	2.75
Skelp, sh'd steel, P'gh., lb.	2.20	2.20	2.45	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.35	2.35	2.45	4.25
Iron bars, Chicago	2.38	2.38	2.60	3.75
Steel bars, Pittsburgh	2.10	2.10	2.00	3.75
Steel bars, New York	2.48	2.48	2.38	4.02
Tank plates, Pittsburgh	2.20	2.20	2.00	3.75
Tank plates, New York	2.58	2.58	2.38	4.02
Beams, etc., Pittsburgh	2.20	2.20	2.00	3.25
Beams, etc., New York	2.58	2.58	2.38	3.52
Steel hoops, Pittsburgh	2.75	2.75	2.80	5.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Apr. 26, 1921 Cents	Apr. 19, 1921 Cents	Mar. 29, 1921 Cents	Apr. 27, 1920 Cents
Sheets, black, No. 28, P'gh.	4.00	4.00	3.85	5.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	7.00
Sheets, blue an'l'd, 9 & 10	3.10	3.10	3.00	4.50
Wire nails, Pittsburgh	3.25	3.25	3.00	4.00
Plain wire, P'gh	3.00	3.00	3.00	3.50
Barbed wire, galv., P'gh.	4.10	4.10	3.85	4.45
Tin plate, 100-lb. box, P'gh.	$6.25	$6.25	$7.00	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$14.25	$14.00	$14.00	$37.00
Carwheels, Philadelphia	18.00	18.00	18.00	40.00
Heavy steel scrap, P'gh.	13.00	12.50	13.00	25.00
Heavy steel scrap, Phila.	11.00	11.00	12.50	24.00
Heavy steel scrap, Ch'go	11.00	11.00	11.00	23.50
No. 1 cast, Pittsburgh	18.00	18.00	20.00	32.00
No. 1 cast, Philadelphia	18.00	18.00	18.00	38.00
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.50	37.00
No. 1 RR. wrot, Phila.	17.00	17.00	17.00	35.00
No. 1 RR. wrot, Ch'go (net)	10.00	10.00	10.50	27.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.50	$4.00	$11.00
Furnace coke, future	*3.75*	4.00	5.25	11.00
Foundry coke, prompt	4.50	4.50	5.50	11.00
Foundry coke, future	5.00	5.00	6.00	11.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.75	12.75	13.00	19.25
Electrolytic copper, N. Y.	*12.37½*	12.50	12.62½	19.25
Zinc, St. Louis	4.95	4.65	4.65	8.00
Zinc, New York	5.45	5.15	5.15	8.35
Lead, St. Louis	4.35	4.25	4.00	8.40
Lead, New York	4.35	4.25	4.25	8.75
Tin, New York	32.00	31.00	29.25	60.50
Antimony (Asiatic), N. Y.	5.25	5.12½	5.25	11.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

which calls for a production of 100,000 cars and one of the important divisions, if not the most important, of the General Motors Corporation is reported to be getting ready to resume after several months of almost complete idleness. It now seems probable that the automobile industry will keep reasonably busy into the third quarter of the year and this condition finds reflection both in a fairly good demand for sheets and in releases against suspended tonnages. It is estimated that operations of independent sheet mills this week are about 50 per cent of capacity, and this condition is largely ascribable to the demands of the automobile industry. So far, the makers of other kinds of automobile steel have not benefited very much, and there is no disposition on the part of the steel industry as a whole to become over-enthusiastic because the makers of automobiles are to-day enjoying a fair degree of prosperity, for it is realized that the consumption of steel by car manufacturers is small compared to the whole, and a cut in car prices, which is commonly intimated, might not greatly stimulate the market for motor vehicles.

The price of Pennsylvania crude oil has moved upward 50c. per barrel from the recent low point, and in other producing sections a similar tendency is noted. This development encourages the belief that drilling will be on a heavier scale than seemed likely a short time ago, and that this will prove a considerable stimulus to the demand for oil country pipe, now of rather moderate proportions. Little activity is observed in the major products except that there is some demand for plates for tanks, due to the fact that oil producers regard present prices as too low and for that reason they are inclined to store rather than sell their product. Wire products are showing rather disappointing demands for the season of the year.

The market in semi-finished material remains extremely limited. The most important pig iron transaction was one involving 5000 tons to a Valley steel maker which developed a fresh decline of 50c. per ton the iron moving at $22.50, Valley Furnace. Merchant producers of the steel making grades of iron have abandoned the idea of holding to a price and now are waiting on buyers to start negotiations.

The coke market still is weak, but there has been a reaction from the recent extreme decline in scrap prices. Outside of the gains recorded by the independent sheet makers, no important change can be reported in steel plant operations. Such advantages as have accrued from stabilized prices seem to have been more in favor of the Steel Corporation than the independents, and while there is strict adherence to the new schedules on the part of the latter, to date, intimations are beginning to be heard of the disappointment that exists over the failure of business to improve.

Pig Iron.—The outstanding feature of the past week has been the abandonment by merchant producers of the steel making grades of their recent price position which involved quotations of $25 furnace for basic and $27 furnace for Bessemer and a refusal to consider less on the ground that these prices represented costs. To-day these interests have no fixed quotation and are ready to consider bids. A Valley steel maker recently bought from another Valley steel maker 5000 tons of standard basic for early delivery, at $22.50 furnace. This sale establishes the market on that grade. An even lower quotation is reported to have been made against the inquiry for 10,000 tons of basic recently put out by the United Alloy Steel Corporation, Canton, Ohio, but this company has decided to start up its own furnace rather than buy outside. Figuring in the overhead on its own furnace, the gas and power drive when it is in blast, not to mention the saving obtained in

using hot metal and freight, the management of the company has decided that the iron can be produced practically as cheaply as it could have been bought. The United Alloy furnace will go into blast about May 1. The Standard Sanitary Mfg. Co. recently started up its Allegheny works, but does not expect to keep it going more than a month. There is a fairly good stock of iron at this plant, but it was found necessary to buy 500 tons of No. 2 and No. 2X iron and $24.50, Valley furnace, was paid for the base grade. The West Penn Steel Co. has been negotiating for 500 to 1000 tons of basic iron and it is reported to have placed the business at $24.50 delivered, which would figure back about $22.50, Valley furnace. Confirmation of this sale, however, was lacking. High silicon basic iron is reported to be freely offered by steel companies at $22 Valley furnace or on Valley furnace basis. Some foundries could use this iron by an admixture of high phosphorus iron, but few of them are inclined to disrupt their normal practice which the use of such iron would entail.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$22.50
Bessemer	25.00
Gray forge	23.50
No. 2 foundry	24.50
No. 3 foundry	24.00
Malleable	25.00

Ferroalloys.—Conditions are much as they have been for several weeks past with almost no demand and prices entirely a matter of negotiation. Producers are more anxious to sell than consumers are to buy and if there is any definite trend of prices, it is downward. Resale tonnages of 50 per cent ferrosilicon again are quite freely offered at prices ranging from $85 down to $80 furnace, freight allowed, and this constitutes the quotable range in view of the fact that all current needs easily can be supplied from the resale offerings. Extremely low prices are being quoted against the lower grades of ferrosilicon, made in electric furnaces, as compared with those quoted against the blast furnace product. For instance, 10 per cent electric furnace ferrosilicon is quoted by one maker at $34 furnace, or $36.90 delivered Pittsburgh, as compared with $48 furnace, the present quotation of Jackson, Ohio, interests making this material in blast furnaces. Makers of spiegeleisen continue to quote 20 per cent material at $33 to $35 furnace, but sales at these prices are out of the question at the moment as wants are small and are easily met from resale offerings which are to be had at $30 or less.

We quote 76 to 80 per cent ferromanganese at $85 to $90 delivered on domestic and $100 c.i.f. Atlantic seaboard, the nominal quotation of English producers. We quote average 20 per cent spiegeleisen at $30 to $35 furnace, 50 per cent ferrosilicon, $80 to $85 furnace, freight allowed, for domestic and $90 to $95 delivered for foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $44.50; 10 per cent, $48; 11 per cent, $51.30; 12 per cent, $54.60. Silvery iron, 6 per cent, $35; 7 per cent, $36.50; 8 per cent, $38.50; 9 per cent, $40.50; 10 per cent, $43; 11 per cent, $46.30; 12 per cent, $49.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Not much snap has recently characterized the demand. Although business in sheets has improved rather more than most other finished products, makers appear to be well covered on sheet bars, as they have not been buying or putting out many inquiries in the past week. No interest whatever is being shown by finishing mills in billets or slabs and inquiries for forging billets are few and rarely exceed one or two carloads. There is close adherence to the stabilized quotations, although buyers are disposed to draw attention to the wide spread which now exists between basic pig iron and billets and sheet bars.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $37; 2 x 2-in. billets, $39; Bessemer and open-hearth sheet bars, $39; slabs, $38; forging billets, ordinary carbons, $42, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand does not increase much for the reason that there is not yet much genuine activity in the products of rods. All makers are quoting the base size of soft rods at $48. Prices are given on page 1045.

Iron and Steel Bars.—All makers of merchant steel bars are holding firmly to the stabilized base of 2.10c., but new demands are few and small, as most customers of the independent makers still are getting deliveries against orders placed prior to April 8. Demand for reinforcing bars reflects the moderate amount of new construction. These bars, rolled from new steel, are quoted at the same base as soft steel bars, but those rolled from old rails are available as low as 1.90c., although the general asking price is 2c. There is no change in the situation in iron bars, either as regards prices or demand. The bi-monthly bar iron wage conference was held in Youngstown, Ohio, yesterday and disclosed an average sales price for the 60 days ending last Wednesday, of 2.55c., as compared with 2.80c. for the previous period. This means a reduction of $1.26 per gross ton in the puddling rate for the next 60 days, or from $15.02 per ton to $13.76 per ton. The latter price represents a decline of $4.76 from the maximum puddling rate of last year.

We quote steel bars rolled from billets at 2.10c.; reinforcing bars, rolled from billets, 2.10c. base; reinforcing bars rolled from old rails, 1.90c. to 2c.; refined iron bars, 2.75c., in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Stabilized prices find some basis in small sales, but the bulk of current shipments from independent plants is at prices in effect prior to April 11. It cannot be said that buyers exhibit much confidence in the maintenance of present prices, as they are not disposed to anticipate their needs very far ahead. Discounts on woven wire fencing by those companies which distribute through retailers are 60½ per cent on carloads, 59½ per cent for 1000-rod lots, and 58½ per cent for less carloads. Some who distribute through jobbers allow an additional 2½ per cent discount.

We quote wire nails at $3.25 base per keg, Pittsburgh, and bright basic and Bessemer wire at $3 base per 100 lb. Pittsburgh.

Nuts, Bolts and Rivets.—Some makers of large rivets are accepting business in structural rivets at $3.40 and in large boiler rivets at $3.50, or $2 per ton below recent quotations. A double quotation, however, is justified for the reason that other makers holding to $3.50 and $3.60 report some business at those figures. The Steel Corporation has established a price of $4.35 Pittsburgh on track bolts, but some independents continue to quote $4.50 and $4.75. No change is noted in machine or carriage bolts or nuts, except that most makers report business to have been better in the past week than before in some little time. Prices and discounts are given on page 1045.

Chain.—Effective April 23, the American Chain Co. issued a new price list naming a base of 6.25c. for 1-in. proof coil steel chain, and reducing the differential on sizes ½-in. and smaller 25c. per 100-lb. This revision means a reduction of $10 per ton in the sizes larger than ½-in. and of $15 per ton in sizes ½-in. and smaller. The United States Chain & Forging Co. has followed this revision and other makers who recently have been on a base of 6.35c. for 1-in. proof coil are expected to go to the 6.25c. base.

Spikes.—The Steel Corporation, through its producing subsidiary, the Illinois Steel Co., has announced new prices on spikes and other track fastenings. On spikes it has established a base of $3.40 on all sizes from 5/16-in. up to ⅝-in. Hitherto there have been separate bases for 9/16-in. and larger, for ½-in., 7/16-in. and ⅜-in. and for 5/16-in. The Steel Corporation base on bolt and barge spikes also is $3.40, while it has placed track bolts at $4.35 and tie plates at $2.50. These prices are expected to be generally adopted, although at the moment some independent makers are quoting bolt and barge spikes at $3.65 base, and some makers here report business in track bolts at $4.50 and $4.75. Fair demand is coming out for small spikes from jobbers serving the nearby coal fields, who anticipate a better business in coal and more development work as a result of an expected freight rate reduction on coal going to the Northwest. New prices are given on page 1045.

Iron and Steel Pipe.—Business has not improved materially, but the fact that the price of oil again is tending upward improves the prospect for larger demand for oil country pipe as it is believed the rally in oil prices, which in the case of Pennsylvania crude oil amounts to 50c. per bbl., will prove a considerable stimulus to drilling. New building construction still is of such limited proportions that the use of merchant pipe

especially in the smaller sizes, continues much below normal and jobbers are not reducing their stocks rapidly enough to be urgently in need of fresh supplies. Makers of wrought iron pipe, however, have had a fair number of releases against suspended orders, since the recent downward revision of prices. Discounts are given on page 1045.

Plates.—Business is of small proportions and inquiry is confined entirely to builders of oil storage tanks, who are figuring against inquiries from oil producing interests who regard present prices as too low and consequently are inclined to seek storage facilities. The Chicago office of the American Bridge Co. recently took 12 80,000-barrel tanks for the Standard Oil Co. of Indiana, for erection in Casper, Wyo., for which about 3500 tons of plates will be wanted. The Memphis Steel Construction Co. has taken a couple of 55,000-barrel tanks for erection in the Eldorado Field in Texas, for which about 450 tons of plates will be required. About 1200 tons of plates will be needed for some tanks which it is understood were placed by the Midwest Refining Co. for Casper, Wyo., with the Chicago Bridge & Iron Works. All makers are adhering to the stabilized base of 2.20c., Pittsburgh, on plates, but there is now reason to suppose that some of the tonnage going into the tanks recently placed will carry a lower price as several of the independent companies gave the tank builders protection when they recently advanced prices.

We quote sheared plates of tank quality ¼ in. and heavier at 2.20c., Pittsburgh.

Structural Material.—All of the fabricating interests are figuring against a large number of structural projects, but actual awards are few and small, presumably because the stabilization of plain material prices has impressed investors with the idea that they have nothing to lose by holding off for a while. The Pittsburgh Des Moines Steel Co. has taken 100 tons for St. Philomena's School and Parish House, Beechwood Boulevard, Pittsburgh, while the McClintic-Marshall Co. reports awards of 100 tons for a factory building for the Kraemer Hosiery Co., Nazareth, Pa., and 100 tons of roof forming and columns for a theater at Nineteenth and Chestnut streets, Philadelphia. Plain material prices are given on page 1045.

Steel Rails.—Report that the price of light rails had been stabilized at 2.45c. is in error. The Steel Corporation has fixed the price at 2.20c. base, a decline of $5 per ton from the Industrial Board schedule, and independents generally have adopted this base, although one is reported to be asking 2.25c. One of the companies which ordinarily rolls light rails from old standard sections is reported to have a burdensome stock of light sections rolled from shell steel against which a quotation as low as 1.90c. mill has been made. Demand for light rails is dull almost to the point of stagnation.

We quote 25 to 45-lb. sections, rolled from new steel, 2.20c.; rolled from old rails, 1.90c. to 2c.; standard rails, $45 mill for Bessemer, and $47 for open-hearth sections.

Sheets.—Business is better largely as a result of the sustained improvement in the operation of the automobile companies. Demands from other sources also show some increase, but there are more releases against suspended shipments than new orders. Close observance of the stabilized quotations is noted, although there are reports, presumably because of unfamiliarity with the new schedules, that slight concessions from regular prices have been made. Independent mill operations, notably in the Mahoning Valley, are the highest of the year to date, and the American Sheet & Tin Plate Co. is operating better, although it has not yet made any additions to active capacity. Prices are given on page 1045.

Tin Plate.—Demand still is slow, not that the price is unsatisfactory, but rather because the refusal of the retail dealers to reduce their prices in conformity with current replacing costs is holding back the liquidation on stocks of canned goods and the packers are disposed to go slowly with regard to this year's program until their stocks are materially reduced. Container manufacturers are pursuing a like policy with regard to tin plate purchases, and few, if any, of the mills have what might be termed even a fair rolling schedule. Production plate is quoted at $6.25 per base box, Pittsburgh, but there is more interest at the moment in stock items which are being offered rather freely at $5.75.

Boiler Tubes.—Effective, April 20, the Parkesburg Iron Co. adopted a new list of prices on charcoal iron boiler tubes, showing a reduction from its former card of $16 to $20 per ton. Other makers have adopted the same schedules. The new card differs slightly from the old one in that 2 and 2¼-in. tubes are bracket at one price instead of being quoted separately as in the former card. The spread between steel and iron boiler tubes is much narrower than it has been because of the steep cut just made in the latter. Demand has not improved materially. Discounts are given on page 1045.

Cold-Finished Steel Bars.—Business does not improve much, as the automotive industry, the principal source of outlet, still has a sizable inventory and is buying only to the extent of rounding out stocks. The recently established base of 3.10c. for carload lots is being strictly observed.

Hoops and Bands.—Business is not a great deal better at the new base of 2.75c. than it was when the Steel Corporation was quoting 3.05c. and the independents were letting buyers name practically their own terms. Consuming interests apparently still have fairly sizable inventories to work off, as such purchases as are now being made are entirely in small lots.

Hot-rolled and Cold-rolled Strips.—There is a slightly better business in both hot-rolled and cold-rolled strips, but the gain so far is nothing to brag about. The hardware manufacturing trade is not yet an active buyer and probably will not be until after May 1, by which time it will have been determined whether labor is going to stand in the way of new building construction. Such improvement as has developed in the movement of strip steel is traceable directly to the automobile industry. Stabilized prices of 2.75c. base for hot-rolled strips and 5.50c. base for cold-rolled find close adherence at the moment on the part of all makers.

Coke and Coal.—There has been a further easing in prices of beehive oven furnace coke, not that the supply is large, but because it is more than sufficient for the current demand. One large Connellsville operator in an effort to live up to an agreement with his men, to provide full employment, has accumulated a huge stock because of the light demand, and has let his price down to $3.25. The spot market is quotable from $3.25 to $3.50 per net ton oven, for while present needs are extremely limited, a number of producers would prefer to keep their plants idle rather than go below $3.50 and buyers who insist upon low sulphur coke have not been able to get supplies much below that price. The contract market on furnace coke is quotable from $3.75 to $4.25, this range being based upon bids upon tentative inquiries, rather than on sales. While producers of selected 72-hr. fuel are not inclined to go below $5 against spot demands, good foundry coke is available as low as $4.50. As high as $6.50 is quoted by at least one producer of foundry coke, but sales are confined to those interests which would not have any other brand. The contract foundry coke market is nominal. Coal prices vary widely, particularly in steam coal, where the range is from $1.75 f.o.b. mines for the so-called Klondyke and Sewickley vein coal, up to $2.50, the price demanded by operators located along the line of the Panhandle road. Gas coal is quotable from $2.25 to $2.75 at mines, for mine run grade, while $2 represents the top and bottom on mine run grade of by-product coal. Business is of extremely moderate proportions, particularly in by-product grade.

Old Material.—While the past week has developed no increase in the consumptive demand for scrap, other than a few releases by steel companies which previously had been holding up shipping instructions, prices range somewhat higher than they did a week ago, this representing a reaction from quotations that palpably were

(*Continued on page* 1144)

New York

NEW YORK, April 26.

Pig Iron.—Sales have been limited to small lots, but the feeling in the market is somewhat improved. Foundrymen report a slow but encouraging increase in their melt and the settlement of the wage controversy by the Stove Founders' National Defense Association and their molders gives reason for hoping that many strikes now pending, particularly those in New Jersey, may be adjusted on an equitable basis and that the demand for pig iron will soon increase.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$28.52 to $29.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.52 to 28.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	26.52 to 27.52
Buffalo, sil. 1.75 to 2.25	32.46 to 33.46
No. 2 Virginia, sil. 1.75 to 2.25	31.16 to 32.16

Cast Iron Pipe.—A gradually broadening inquiry for cast iron pipe is noted. Most of the pipe foundries are now operating at about 50 per cent of capacity. A favorable indication is the increasing number of small inquiries. The city of Jersey City, N. J., this week received bids on 500 tons of 6 to 20-in. pipe. R. D. Wood & Co. were low bidders at the low price of $53.95. Nominal quotations f.o.b. New York follow: 6-in. and larger, $63.30; 4-in., $73.30; 3-in., $83.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—The market continues dull. Prices show no change. Some concessions from prevailing prices are reported when good orders are in prospect. Bars are generally quoted at 3.23c per lb. base; beams and channels, angles and tees at 3.23c to 3.33c. per lb., base and plates at 3.23c to 3.33c. per lb. base. Brass and copper prices out of warehouse are unchanged with the exception of hot-rolled sheet copper, which is now generally quoted at 22c per lb. base. The pipe market is dull, no result having as yet appeared from the recent price revision. We quote boiler tubes as follows:

Lapwelded steel boiler tubes, 2 in. and 2¼ in., list; 2½ in. to 3¼ in., 8 per cent off; 3½ in. to 4½ in., 10 per cent off. Seamless steel boiler tubes, price in cents per foot; 1¾ in., 26c.; 2 in., 25c.; 2¼ in., 29c.; 2½ in., 36c.; 2¾ in., 39c.; 3 in., 43c.; 3¼ in., 51c.; 3½ in., 55c.; 3¾ in., 60c.; 4 in., No. 10, 72c., and No. 9, 85c. Average price for cutting to length; 2 in., 10c. each; 2½ in., 12c. each; 2¾ in., 14c. each; 3 in., 18c. each; 3½ in. and 4 in., 20c. each.

We quote other prices on page 1158.

High Speed Steel.—Orders continue small and scarce, although there is some expectation that with numerous automobile manufacturers operating there may soon be some light purchasing from this source. Producers are generally quoting 18 per cent tungsten high speed steel at $1 per lb. Some transactions are reported at lower prices.

Finished Iron and Steel.—Except for a fair volume of business in structural steel, the local market continues dull. A few good-sized inquiries for concrete reinforcing material alone stand out. An Eastern builder with a Detroit contract is inquiring for 5000 tons of reinforcing bars, deliveries to extend over a period of about a year. For a grain elevator to be built in Brooklyn in connection with the State barge canal 1000 to 2000 tons of reinforcing bars are being quoted on. Another inquiry calls for 400 tons. The largest inquiry for plates and shapes comes from an Eastern car manufacturer, who is figuring on 1000 steel frame box cars for the Erie Railroad. Repairs of 2000 cars for the Lehigh Valley Railroad are under consideration; of these 1000 are wood box cars, 500 wood coal cars and 500 steel coal cars. Prices of finished steel appear to be firm at the levels recently announced, the only divergence reported being quotations of 2c., Pittsburgh, on bars, but it is stated that such quotations emanate from the smaller mills which sell principally re-rolled material. Low prices are being quoted by fabricators on steel structural work, a large office building and theater in New York being let at $87.50, erected, this being a low price for New York construction of this type. Structural steel lettings for the week total more than 6000 tons and include the following: 2000 tons for the Colonnade office and theater building, Broadway at Fifty-eighth Street, New York, to Hay Foundry & Iron Works; 900 tons for a National bank building in Cincinnati to Bethlehem Fabricators, Inc.; 400 tons for a Maine Central bridge to the Bethlehem Steel Bridge Corporation; 300 tons for a public school building, Troy, N. Y., to West Side Structural Co.; 300 tons for a Turkish bathhouse, New York, to Center Iron Works; 1000 tons for the Trust Co. of New Jersey office and bank building, Jersey City, N. J., to an unnamed fabricator; 750 tons for an apartment house in New York City to an unnamed fabricator; 200 tons for a theater at Forest Hills, Long Island, to George A. Just Co.; 350 tons for an office building at Nassau Street and Maiden Lane, New York, for the Lawyers' Mortgage Co., to Eidlitz & Ross. Inquiries in the market include 300 tons for an athletic building at Hamilton College, Clinton, N. Y.; 225 tons for buildings at Norfolk, Va., for the Bureau of Yards and Docks, U. S. Navy; 250 tons for a Bell telephone building, Philadelphia. The New York State Engineer's office has specified the Strauss type of bascule bridge for a project over the Hudson River at Troy, N. Y.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.48c., plates and structural shapes, 2.58c.; bar iron, flats, wider than 6 in., 2.98c., with half extras; light rounds, squares and flats, 3.48c., with full extras, and other sizes, 2.48c., with half extras.

Old Material.—Little activity is noted and transactions are so few that it is difficult to determine actual prices. The only noteworthy incident that occurred during the past week was the appearance of an inquiry from the Bethlehem Steel Co. for from 25,000 to 30,000 tons of heavy melting steel at $11 per ton delivered. Some dealers consider it doubtful if such a large tonnage can be obtained at present for this price. One New York dealer has closed for between 300 and 400 tons of high quality heavy melting steel for shipment to Scotland at a price said to be $11 per ton f.a.s. New York. Owing to the dull condition of the market, one broker who regularly publishes a weekly price list of his buying prices on old material suspended publication for this week.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $7.75
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	40.00 to 42.50
Steel car axles	11.50 to 12.00
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	10.00 to 11.00
Wrought iron track	7.00 to 7.75
Forge fire	6.00 to 7.00
No. 1 yard wrought, long	8.00 to 9.00
Light iron	2.00 to 3.00
Cast borings (clean)	4.00 to 4.50
Machine-shop turnings	3.00 to 4.00
Mixed borings and turnings	3.00 to 4.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 8.00
Stove plate	10.00 to 11.00
Locomotive grate bars	9.00 to 9.50
Malleable cast (railroad)	8.00 to 8.50
Old car wheels	14.00 to 14.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 17.00
No. 1 heavy cast, not cupola size	10.00 to 11.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 11.00

Ferroalloys.—There is almost no demand for ferromanganese or spiegeleisen. What there is is confined to carload lots for early delivery, the few sales of each alloy having been made at the prevailing price, which is $90, delivered, for American ferromanganese and $32 to $36, furnace, for spiegeleisen. There has been no test of the British ferromanganese market which continues at $100, seaboard. Imports of ferromanganese in March were only 790 gross tons which brings the total for the nine months ended March 31, 1921, to 40,742 tons as against 26,280 tons for the nine months ended March 31, 1920. The question of duty is still in the formative stage. Some are suggesting $1 per unit on ferromanganese or $80 per ton with 40c. per unit also imposed on the foreign ore. There is no activity in the foreign manganese ore market, which continues nominal at 25c. to 30c. per unit, seaboard. This level could possibly be shaded on a desirable order. Importations continue very heavy, those

for March having been 69,710 tons, which bring the total for the nine months ended with March, 1921, to 563,678 tons, contrasted with 151,098 tons for the same nine months a year ago. The 50-per cent ferrosilicon market is completely changed, owing to the wide variance in bids which have been made public on 200 tons for the Naval ordnance plant at Charleston, W. Va., the lowest bid having been $82.50 per ton, delivered. Some of the producers making the low bids referred to are still quoting $90, delivered, but it can be stated that one seller will take business on contract at $80 per ton, delivered, which we quote as the market.

Cincinnati

CINCINNATI, April 26.

Pig Iron.—The inquiry for 1000 tons of basic from Columbus, reported last week, developed some keen competition. This order will likely be placed within the next two days. An inquiry for 300 tons of foundry iron from a central Ohio melter, and one for a similar tonnage of Southern iron for the Birmingham plant of the American Radiator Co. are the only ones of any size now before the trade. Sales during the week were mostly for carload lots, though one of 200 tons of malleable to an Indiana melter is reported. Prices are softer, southern Ohio foundry iron having sold at $25, Ironton basis, while carload sales of Southern iron are reported at $23. The wage agreement reached between the Iron Molders' Union and the Stove Founders' National Defense Association is looked upon as an encouraging sign for the future, and the hope is expressed that an agreement will be reached between the jobbing founders and their employees. While immediate results, so far as pig iron buying is concerned, are not expected to follow such an agreement, it would undoubtedly pave the way for an earlier resumption of foundry operations than if the deadlock continues indefinitely. Bellefonte stack at Ironton went in on Bessemer last week, and it is reported that Jisco furnace will blow in some time next month.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.50 to $27.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.75
Ohio silvery, 8 per cent sil.	41.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	27.52
Basic, Northern	26.52
Malleable	27.52

Coke.—There is some activity in the coke market. The Whitaker-Glessner Co. at Portsmouth, Ohio, is inquiring for 500 tons of furnace coke a day for 30 to 60 days, shipments to commence May 5. A sale of approximately 400 tons of New River foundry coke at $8.50 definitely establishes the market for this district, but some producers are still quoting $10. Wise County foundry coke has sold at $6.50. Connellsville furnace coke is quoted at $3.50 to $4, and foundry at $4.50 to $5.50. Some interest is being shown by consumers in futures, but producers are not inclined to name prices.

Finished Material.—While it is still a little early to notice the results of the stabilization of steel prices, some orders are being received. Buying, however, is still of a hand-to-mouth variety. Some activity is noticed in light rails and one order for 150 tons was booked at 2.45c. Several 100-ton orders for bars were also placed during the week at the regular price of 2.10c. There is very little activity in plates, shapes and sheets. Inquiries for re-enforcing bars are becoming more plentiful, one of these calling for approximately 300 tons. In the structural field there has been very little activity although a number of small jobs have been up for bids. The Moss Iron Works has been awarded 200 tons for a high school building in Ironton, Ohio. The Big Four will likely award 300 tons of bridge work during the week. The H. K. Ferguson Co. has taken a contract for a steel and concrete storage building at Pineville, Ky. Another project at Middlesboro, Ky., is a hotel to cost $150,000. The Borderland Coal Corporation has been given authority to construct a bridge across the Tug Fork of the Big Sandy River in Mingo County, W. Va. F. R. Jones & Co., Chicago, were low bidders for the Mohawk-Brighton section of the rapid transit project in Cincinnati. This will take several hundred tons of reenforcing bars.

Warehouse Business.—The improvement noticed last week bids fair to continue. Buying, however, is still being confined to small tonnages for immediate shipment. The only price change during the week was an advance in the price of wire nails to $3.85 per keg base.

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c base; shapes, 3.45c. base; plates, 3.45c. base; reinforcing bars, 3.42½c. base; cold rolled rounds, 1½ in. and larger, 4.85c.; under 1½ in. and flats, squares and hexagons, 5.35c. No. 10 blue annealed sheets, 4.35c.; No. 28 black sheets 5.50c.; No. 28 galvanized sheets, 6c.; wire nails, $3.85 per keg base; No. 9 annealed wire, $3.60 per 100 lb.

Old Material.—There is no activity in the scrap market. Dealers are buying only for yard stocks. Outside of the railroads, very little scrap is being offered. The Big Four has a list ready. The prices quoted represent those at which most recent transactions have been made, and to-day may be regarded as nominal.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$7.50 to	$8.50
Iron rails	16.50 to	17.50
Relaying rails, 50 lb. and up	30.50 to	31.50
Rerolling steel rails	11.50 to	12.50
Heavy melting steel	10.00 to	11.00
Steel rails for melting	10.50 to	11.50
Car wheels	14.00 to	15.00
Per Net Ton		
No. 1 railroad wrought	10.00 to	11.00
Cast borings	5.00 to	5.50
Steel turnings	3.50 to	4.00
Railroad cast	13.50 to	14.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	8.00 to	9.00
Iron axles	20.00 to	20.50
Locomotive tires (smooth inside)	10.00 to	11.00
Pipes and flues	7.50 to	8.00

Birmingham

BIRMINGHAM, ALA., April 26.

Pig Iron.—The pig iron market was apparently stronger at the close of last week than in some time. An insistent report that open quotations of $21 had been made was run down. It developed that one maker had agreed to let a customer have new iron at that figure if he ordered out of yards an equal quantity of the iron that he had bought last fall at $42 but had not moved. The offer was not accepted. Another consumer, after making particularly vigorous effort to secure about 1000 tons on a base of $20, was also turned down and bought several car lots from each of two makers at $23. There was less disposition to shade $23 at close of the week than in the fore part. Inquiries from pipe makers out of the Birmingham district served to strengthen the market tone. Car lots continued to sell at $25 with about the same regularity as at $23. Undoubtedly a large tonnage could be secured under $23, but it would have to be large. The makers feel better than they have. Prices are so close to cost of production that they will not easily be forced to lower levels unless the inducement is especially attractive. There is convincing evidence of increase in small foundry activity in the South. Charcoal iron has been reduced to $35 and a sale of 100 tons for export via Pacific Coast is reported. No charcoal iron is being made. At end of the week, iron makers expressed greater confidence in the prospect than they had in some time.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$23.00 to $25.00
Basic	22.00 to 24.00
Charcoal	35.00

Finished Material.—The steel trade has distinctly improved. The plate mill of the Tennessee company at Fairfield operated on double turn last week for the first time in several weeks. Two ships are loading simultaneously in Mobile this week with Birmingham steel for the Orient. The cargo includes the 10,000 tons of rails for the Manchurian railroad rolled at the Ensley mills of the Tennessee company and plates. The shipment to Mobile was made in Warrior River barges at a saving of 90c. per ton. The Gulf States Steel Co. has received orders aggregating around 50 per cent larger tonnage than in the same period in March. The total is not large, but indicates a distinctly stronger demand. Agencies of Northern steel mills report a

good inquiry for steel pipe. Independent mills agree that the better business recently coming out relates to the building movement rather than to the agricultural. Nails and bars are most active. Woven wire fencing is very dull, farmers purchasing barbed wire for fencing because more economical.

Cast Iron Pipe.—Bidding for high pressure pipe at Detroit seems to have brought out a price of $47.50 for large sizes and quantities with $53 for smaller amounts. Even lower was expected. Bidders were disappointed in having 5000 tons go to steel bidders. Birmingham high pressure pipe shops are working about 50 per cent of capacity, new orders including 200 tons for Akron, Ohio, by the National Cast Iron Pipe Co., and 600 tons for Rockford, Ill., by the American Cast Iron Pipe Co. The base of $50 for soil pipe is understood to be under cut by some makers to $48.

Coal and Coke.—Coke is in stronger demand and some additional ovens have been fired. Makers are allowing the lower prices to apply on contracts. One maker has booked capacity delivery for the coming fortnight and another reports a business in April twice that of May. The total is not large, but the increase is encouraging. The prevailing base for standard foundry coke is $7.

Old Material.—Somewhat better conditions and larger operations at independent steel works have tended to stiffen the market for No. 1 steel, but it is still slow to move. All grades are moving only in small quantities. The feeling is better than in some time.

We quote per gross ton f.o.b. Birmingham district yard, as follows:

Steel rails	$13.00 to $13.50
No. 1 heavy steel	12.50 to 13.00
No. 1 cast	18.00 to 19.00
Car wheels	18.00 to 19.00
Tramcar wheels	16.00 to 17.00
No. 1 wrought	15.00 to 16.00
Stove plate	12.00 to 12.50
Cast iron borings	5.00 to 6.00
Machine shop turnings	5.00 to 6.00

Boston

BOSTON, April 26.

Pig Iron.—Activity centers in Pennsylvania iron. One 1000-ton lot of No. 2X was sold this week by an eastern Pennsylvania furnace to a Massachusetts consumer, 200 tons No. 1X by another furnace to another Massachusetts melter and 100 tons No. 1X to a Connecticut foundry. The No. 1X sold at something better than $30 delivered and it is intimated the 1000-ton lot sold at around $24 furnace, but the terms are confidential. Crosscurrents appear in Pennsylvania prices. A furnace heretofore selling at $24.50 base has advanced its price slightly. Another furnace offers No. 1X at $25.50 furnace and lower grades at $1 differentials. There has not been enough done in Virginia, Buffalo and Alabama to constitute a market, furnaces not being willing to meet prices at which Pennsylvania iron is offered. Further cancellations of contracts are reported on a cash settlement basis of $4 to $15 a ton, according to original cost of iron. The average ratio of those New England foundries operating is about 30 per cent of capacity. The industry as a whole, however, is something between 10 and 15 per cent due to plants being closed. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$28.56 to $29.06
East. Penn., sil. 1.75 to 2.25	27.56 to 28.06
Buffalo, sil. 2.25 to 2.75	30.46 to 34.71
Buffalo, sil. 1.75 to 2.25	29.46 to 33.46
Virginia, sil. 2.25 to 2.75	32.58 to 35.83
Virginia, sil. 1.75 to 2.25	31.58 to 34.58
Alabama, sil. 2.25 to 2.75	36.91 to 38.41
Alabama, sil. 1.75 to 2.25	35.66 to 37.16

Warehouse Business.—The recent downward revision in iron and steel prices has failed to stimulate business. The market on bolts is steadier due to a recovery in manufacturer's prices. That on nuts, however, is easier. Wrought washers are now quoted at list less 2c., as against list less 1c., heretofore. Prices for boiler and structural rivets are weaker, the former generally being quoted at $5.85 per keg base from store and the latter at $5.75. Wire nails are still obtainable at $4.10 per keg base from store, although most houses ask $4.35. The market on drop forge wrenches is 10 per cent lower.

Jobbers now quote: Soft steel bars, $3.18 per 100 lb. base; flats, $4.18 to $4.28; concrete bars, $3.18 to $3.45½; tire steel, $4.25 to $4.75; spring steel, open hearth, $5.50; crucible, $11.50; steel bands, $3.83 to $4.48; steel hoops, $4.38; toe calk steel, $5.25; cold rolled steel, $4.65 to $5.15; structural, $3.18 to $3.28; plates, $3.28 to $3.50; No. 10 blue annealed sheets, $4.53; No. 28 black sheets, $5.85; No. 28 galvanized sheets, $6.85; refined iron, $3.18 to $5; best refined, $5; Wayne iron, $8.50; Norway iron, round, ¼-in. to 2½-in., 8c. per lb. net; other sizes, 10c. base.

Coke.—The foundry coke situation practically is unchanged. There is, perhaps, a better movement of New England product contract fuel, but it is very slight and spotty. Going business is confined largely to small lots of contract coke with deliveries extending over a period of two or three months at $11.41 delivered where the freight does not exceed $3.40, both for New England Coal & Coke and Providence Gas Co. products. Connellsville foundry coke is offered usually at $5 to $5.50 a ton f.o.b. ovens, with few takers.

Ferromanganese.—The Washburn Wire Co., Phillipsdale, R. I., has purchased a car of ferromanganese at less than $90 delivered.

Old Material.—Foundries show no increased interest in machinery cast. Activity is confined to purchases by dealers at around 50c. per 100 lb. or $11.20 per gross ton shipping point for the purpose of averaging down cost of stock in yards. Yard prices are easier as a result. Two local dealers this week bought a considerable tonnage of grate bars offered by the Government from a nearby point at approximately 61c. per 100 lb., an excessive price in view of quotations on other kinds of scrap. Practically no demand for stove plate exists due to the condition of the stove making industry. The Bethlehem Steel Co. is inquiring on off grades of melting steel and some interest is shown in brass scrap. Dealers this week picked up No. 1 railroad wrought at $9.25 on cars shipping point. Boston prices per gross ton on old material follow:

No. 1 heavy melting steel	$6.00 to $7.00
No. 1 railroad wrought	11.50 to 12.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	3.00 to 3.50
Cast iron borings, rolling mill	3.00 to 4.00
Cast iron borings, chemical	3.00 to 4.00
Heavy axle turnings	4.50 to 5.00
Blast furnace borings and turnings	3.00 to 3.50
Forged scrap and skeleton	5.50 to 6.00
Street car axles and shafting	14.00 to 15.00
Car wheels	19.00 to 20.00
Machinery cast	18.00 to 19.00
No. 2 cast	16.00 to 17.00
Stove plate	11.50 to 12.50
Railroad malleable	11.50 to 12.00
Rerolling rails	10.00 to 10.50

Buffalo

BUFFALO, April 26.

Pig Iron.—A sale of 5000 tons to one purchaser is reported by a local interest. Details were not divulged. Shipment on the order has already begun and the entire tonnage will be filled from accumulated stock without blowing in a furnace. It is understood the shipment went to an Eastern point considerably distant from Buffalo. None of the other local companies figured in the inquiry. The same seller reports sales of 600 tons and 200 tons respectively. A buyer reports a local purchase of 200 tons within the week at $23. None of the local companies have admitted this level for furnace iron. Inquiry is brisk with another seller, but quantities are small and mostly for carload lots, the largest being 500 tons. An effort to maintain a $26 base price is being made, but frequent competition with brokers offering iron at $25 is run into. On an inquiry of 2900 tons figured last week by local interests, a uniform price of $26 was maintained, but as previously reported the order went outside the district and at a price said to be much less than $25. A local bidder for this business said that to take less than $25 would be below cost. A sales agency reports no sales and attributes the lack of business to the high price schedule maintained. This office figured on Eastern business without success. An inquiry for 1000 tons involving

malleable and foundry iron, and an inquiry for 600 tons of foundry iron are engaging this office.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$28.00 to $29.00
No. 2X foundry, 2.25 to 2.75 sil.	26.25 to 27.25
No. 2 plain, 1.75 to 2.25 sil.	25.00 to 27.00
Basic (nominal)	26.00 to 27.00
Malleable (nominal)	27.00 to 28.00
Lake Superior charcoal	38.00

Coke.—All business seems to call for spot shipment. Prices on good foundry coke range from $5.50 to $7.25 at the Connellsville ovens. Business justifies the belief that many cupolas are in operation.

Finished Iron and Steel.—The uncertainty which characterized this market seems to have disappeared, though no new business has developed. The market seems to be settled and price cutting is not evident. Structural business is better and likewise orders for reinforcing bars have improved. No improvement is noted either in tin plate, pipe, or plates. The wire interest which has consistently reported good business states improvement is apparent each day. Small orders for bolts and nuts are reported. An inquiry for 600 to 800 tons of wire, said to be in the market for the past month, is now reported to have been sold by a Middle West mill. A company which recently shut down a bar mill reports nothing in sight to justify resumption. This interest finds inquiry better and that business calls for immediate shipment, none of the orders being for future delivery. Work on the new University of Buffalo will be started within the week. The John W. Cowper Co. will erect the chemistry building.

Warehouse Business.—A better demand for blue annealed sheets is noted by one seller. The entire market seems stabilized subsequent to the price readjustment. There is more activity in structural material due to intermittent mill operation. Better business from the oil interests in Pennsylvania is noted. Transactions continue small.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.25c.; plates, 3.25c.; plates No. 8 gage, 4.10c.; soft steel bars and shapes, 3.15c.; hoops, 3.85c.; blue annealed sheets, No. 10 gage, 4.15c.; galvanized steel sheets, No. 28 gage, 6.30c.; black sheets, No. 28 gage, 5.30c.; No. 9 gage annealed wire, 4.35c.; cold rolled strip steel, 8.15c.

Old Material.—A better feeling is evident, but sales do not bear out the feeling. A buyer claims to have been offered by Pennsylvania dealers locomotive grate bars delivered to his yard near Buffalo at $13.50 per gross ton. Better inquiry for borings, turnings and low phosphorus is evident. Car wheel prices are down $1 per ton. A sale to a railroad equipment manufacturer of heavy melting steel previously reported has strengthened the market in that particular material and a sale of 2000 tons of heavy melting has been made at $13.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$12.50 to $13.00
Hydraulic compressed	9.00 to 9.50
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	13.00 to 14.00
Car wheels	16.00 to 17.00
Railroad malleable	11.50 to 12.50
Machine shop turnings	7.00 to 8.00
Heavy axle turnings	10.00 to 11.00
Clean cast borings	7.00 to 8.00
Locomotive grate bars	11.50 to 12.50
Wrought pipe	9.50 to 10.50
No. 1 busheling	9.50 to 10.50
Stove plate	15.00 to 16.00
Bundled sheet stampings	7.00 to 8.00

Puddlers' Wages Reduced

YOUNGSTOWN, OHIO, April 26.—Wages of puddlers and bar iron finishers will be reduced about 8 per cent for the May-June period as a result of the bi-monthly examination of sales sheets by the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. The examination of sales sheets showed an average selling price on bar iron of 2.55c. per lb., as compared with 2.80c. at the settlement two months ago. This entitles puddlers to a wage rate of $13.76 per ton, which compares with $15.02 paid during March and April. The finishing charge per ton is reduced from $1.775 to $1.625.

During the past 60 days, labor charges, therefore, represented 30 per cent of the selling price of bar iron at $57.10 per gross ton.

Philadelphia

PHILADELPHIA, April 26.

Nothing has occurred within the past week to change the general market situation of iron and steel. There is a light demand, which does not show any very promising signs of expanding, and independent mills are forced to work hard for orders to maintain even a 25 or 30 per cent operation.

Sellers believe that one of the good signs is the apparent disposition among buyers to accept the new price level, there being relatively little haggling over price on the small orders that are being placed. Prices are holding firm in most instances, though there are reports that one or two of the smaller plate mills have offered blue annealed sheets at a shade below the 3.10c. price. An Eastern maker of steel bars is also said to be openly quoting 2c., Pittsburgh, on desirable lots. These mills are not large enough, however, to cut much of a figure.

Some of the reports of price-cutting have been traced to purchases made under the protection given by independent mills. Such protection was given by practically all of the independents on quotations outstanding at the time their prices were advanced. Most of the protections have expired, but a few, particularly on structural work, will run until May 1.

Steel Corporation subsidiaries are reported to be successful in obtaining reinstatement of many suspended orders now that their prices are identical with those of the independents.

Pig Iron.—A few more foundry pig iron consumers are showing an inclination to buy for two or three months ahead, but sellers are discouraging such business. In one instance a furnace declined to accept an order for May-June-July shipment, its present quotation holding good only for delivery within 30 days. A central Pennsylvania consumer bought 2000 tons of basic pig iron last week, the business being divided equally between two furnaces. In one case the delivered price was $25 and in the other about $24.75. There have been no other transactions in basic, but a Delaware steel maker has made several low-priced offers, which have not been accepted. In foundry iron the sales range mostly from single carloads to 200 or 300 tons. The Pennsylvania Railroad is reported to have closed for about 1000 tons of foundry iron for its Altoona shops, a central Pennsylvania furnace getting the order. There is a slightly better tone in the market, but prices are still easy. One furnace, which raised its base price from $25 to $26, did not get much business at the latter figure and returned to the $25 quotation. Another active furnace is quoting $25 for No. 2 plain, $25.50 for No. 2 X and $26.50 for No. 1 X, and has had no difficulty in getting these prices, which are an advance of 50c. a ton over its quotations of two weeks ago. Foundry iron is still available, however, on the basis of $24.50, furnace, and doubtless this could be shaded on a good-sized tonnage for prompt shipment. The Midvale Steel & Ordnance Co., which has several thousand tons of basic, foundry and low phosphorus iron piled at its Coatesville works, has decided to turn this iron into money and is offering it to consumers at the current market prices.

East. Pa. No. 2 plain, 1.75 to 2.25	$25.76 to $26.84
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to 27.84
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74 to 32.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99 to 33.99
Basic deliv. Eastern Pa.	25.00
Gray forge	25.26
Standard low phos. (f.o.b. furnace)	38.00
Malleable	29.90
Copper bearing low phos. (f.o.b. furnace)	35.00

Semi-Finished Steel.—The N. & G. Taylor Co., Cumberland, Md., has inquired for 2000 tons of sheet bars. Otherwise there is very little inquiry for semi-finished material. Open-hearth rerolling billets, 4 x 4 in., are available at $37, Pittsburgh, and forging billets at $42, Pittsburgh.

Ferroalloys.—A few inquiries for carload lots of ferromanganese have come into the market. Domestic producers quote $90, delivered. Spiegeleisen is obtainable at $32 to $35, furnace.

Plates.—There is practically no demand for plates, most of the current orders being for a carload or less. Prospects for business in the fabrication of oil tanks look slightly better, but inquiries have not yet come into the market. Mills appear to be holding firm at 2.20c., Pittsburgh.

Structural Material.—There is very little building work in this district and most of the orders for shapes coming to Eastern mills are for jobs in the New York district or in the Central West. Fabricators continue to figure on a fair volume of building construction, but a great deal is being held back pending the adjustment of wages of building labor to a lower level. We quote plain material at 2.20c., Pittsburgh.

Bars.—One Eastern mill is reported to have openly quoted 2c., Pittsburgh, but this mill is of small capacity, with a limited range of sizes, and under other conditions would not be a factor in the market. Apparently all of the larger mills are holding firm at 2.10c., Pittsburgh. On bar iron it is still possible to place orders at 2c., Pittsburgh, though one seller has been quoting 2.10c.

Sheets.—Some orders are being taken at 3.10c. for blue annealed, 4c. for black and 5c. for galvanized, all f.o.b. Pittsburgh, but the total volume is small.

Warehouse Business.—No gain in business out of stock is reported; in fact April orders do not show up quite so well as those of March. We quote as follows for Philadelphia delivery, there being a $3 per ton reduction for out-of-town shipment:

Soft steel bars and small shapes, 3.10c.; iron bars (except bands), 3.10c.; round edge iron, 3.40c.; round edge steel, iron finish, 1½ in. x ½ in., 3.40c.; round edge steel, planished, 4.15c.; tank steel plates, ¼-in. and heavier, 3.20c.; tank steel plates, 3/16-in., 3.50c.; blue annealed steel sheets, No. 10 gage, 4.10c.; light black steel sheets, No. 28 gage, 5.25c.; galvanized sheets, No. 28 gage, 6.50c.; square twisted and deformed steel bars, 3.20c.; structural shapes, 3.20c.; diamond pattern plates, 5.50c.; spring steel, 5.00c.; round cold-rolled steel, 4.60c.; squares and hexagons, cold-rolled steel, 5.10c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.80c.; iron bands, 4.75c.; rails, 3.10c.; tool steel, 16c.; Norway iron, 8c.; toe steel, 4.50c.

Old Material.—The market continues very quiet, with little change in prices. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.00 to $11.50
Steel rails, rerolling	17.00 to 18.00
No. 1 low phos., heavy 0.04 and under	19.00 to 20.00
Car wheels	18.00 to 20.00
No. 1 railroad wrought	17.00 to 18.00
No. 1 yard wrought	15.50 to 16.00
No. 1 forge fire	11.50 to 12.00
Bundled skeleton	8.00 to 8.50
No. 1 busheling	13.50 to 14.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	7.50 to 8.00
Machine-shop turnings (for rolling mill and steel works use)	8.50 to 9.00
Heavy axle turnings (or equivalent)	11.00 to 12.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	10.50 to 11.50
No. 1 cast	18.00 to 19.00
Railroad grate bars	13.50 to 14.50
Stove plate (for steel plant use)	13.00 to 13.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 13.00
Iron car axles	No market
Steel car axles	No market

Unemployment in Pennsylvania

PITTSBURGH, April 26.—Reports of the district employment offices of the Pennsylvania State Department of Labor and Industry indicate that there has been little improvement in the unemployment situation throughout the State. With the exception of two or three minor industries, the bureaus continue to report an increased demand for work with none to be had. Estimates of the number of unemployed in the districts covered by the offices alone total 260,760. Common labor and skilled clerical workers, together with railroad and metal trades employees, furnish the majority of unemployed.

Following is the report of the estimated unemployed from each office: Altoona, 27,750; Erie, 13,400; Harrisburg, 17.050; Johnstown, 11,115; McKeesport, 11,815; New Kensington, 9600; Philadelphia, 101,000 men and 17,600 women; Pittsburgh, 36,675; Scranton, 20,730; Williamsport, 4025.

Cleveland

CLEVELAND, April 26.

Iron Ore.—Ore firms have revised their estimates of the amount of ore that will be shipped this year, realizing that every additional week of blast furnace operations at the present reduced rate means a further cutting down of the ore requirements for the season. A month ago, estimates were made that ore shipments during the season would be from 35,000,000 to 40,000,000 tons. Now shippers are figuring that the season's movement will not exceed 28,000,000 or 30,000 000 tons, as compared with a lake movement of 58,527,226 tons last year. Additional requests are coming from consumers that shipments on long time contracts be postponed from this season until next year, or that the tonnage due this year on these contracts be canceled altogether. It is stated that in the case of some low-priced contracts the mining companies would not object to cancellations. It is understood that the Steel Corporation has reduced its schedule of ore shipments for the season to 16,000,000 tons. The Pittsburgh Steamship Co., a Steel Corporation subsidiary, has made up its schedule of boat operations, and of the 98 boats operated by this company, 42 will not be placed in commission. The boats that will remain at the docks include 21 barges and 21 small steamers. The company will start some of its largest freighters early in May. Independent ore firms that operate boats have not yet announced definite plans for the curtailment of their vessel operations, but some are not expected to operate over 60 per cent of their vessel capacity. As there is almost a total absence of demand for ore, independent shippers have not decided on the time for the general starting of their boats. Only about a half dozen ore cargoes have been shipped, so far, this month. There are no indications of the starting of a buying movement, which is not expected to begin for several weeks.

We quote delivered lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesabi Bessemer, $7.20; Mesabi non-Bessemer, $6.55.

Semi-Finished Steel.—Inquiry for semi-finished steel in all forms shows an improvement and the McKinney Steel Co. expects to book orders that will permit it shortly to partially resume operation of its plant which has been shut down for some time. Regular prices are being quoted.

Pig Iron.—Considerable improvement in the demand for foundry iron developed during the week, this being attributed almost wholly to the increased activity in the automotive field. This has also resulted in some releases of iron. A Cleveland automobile foundry has released shipping orders for 2000 tons of foundry iron per month, a steel plant has released 5000 to 6000 tons per month, and a Michigan automobile foundry has released four or five carloads a week, this being the first iron this foundry has taken in several months. Because of the improvement in orders, the McKinney Steel Co., which has been operating one of its four Cleveland furnaces, lighted its second large furnace today and will operate one furnace on basic iron and one on foundry iron. This company is now shipping more iron than it is making with one stack. The United Alloy Steel Corporation, which inquired for 10,000 tons of basic iron, has decided to place its furnace in blast instead of buying this iron. On this inquiry it is reported to have received quotations ranging from $22.50 to $25. A local producer reports several sales in the northern Ohio territory, including one 1000-ton lot for prompt shipment. Another lake furnace sold about 1800 tons during the week in lots ranging from carloads to 200 tons, its orders being more numerous than for several months. This business came almost wholly from small foundries for immediate shipment. A local interest reports a good volume of foundry iron sales in New York and New England. Prices have sagged off about 50c. a ton, most of the foundry iron sales being made at $24.50. For Cleveland delivery, foundry iron can be bought from a local furnace at $25, or $1 a ton lower than recently prevailing prices. We note the sale of several small lots of low phosphorous iron at $40. Some resale low phosphorous and also a lim-

ited amount of furnace iron are being offered at around $37. While shipping orders have improved with some producers, others report that their April shipments will not show much change as compared with March.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$24.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$25.50 to 26.50
Southern fdy., sil. 2.25 to 2.75	32.92
Ohio silvery, sil. 8 per cent	41.86
Standard low phos., Valley furnace	40.00

Finished Iron and Steel.—There is an improvement in sentiment among manufacturers in some metal-working lines and this is reflected in a slightly better volume of small orders for steel. However, the stabilization of prices so far has not brought out any attractive business, although some sales are being made at the new prices. Some additional orders have also been booked against quotations made by independent mills before the advance, but it is expected that all these orders will be cleaned up this week. The new prices are apparently being generally maintained and if the present attitude of the mills is not changed, buyers will meet with little success in attempts to break the market. Only one report has come out of any concession, that being a sale of plates by a small mill at 2c. Competition for reinforcing bars is expected to severely test the steel bar market, as rerolling mills have not followed the advance made by independent mills and some continue to quote hard steel bars at 1.90c. In the building field, considerable work in this city is being held up pending a settlement of the wage question in the building trades. A reduction in carpenters' wages yesterday resulted in a strike of union carpenters and as building contractors have been unable to reach an agreement with other building trades that are resisting a wage reduction, a general strike in the building trade seems probable May 1 when present agreements expire. In structural lines, the Lackawanna Bridge Co. has taken 560 tons for a plant for the Hinde & Dauch Paper Co., at Fort Madison, Iowa, and the Massillon Bridge & Structural Co. has taken 186 tons for a factory building for the B. L. Marble Co., Bedford, Ohio. The Kelly Island Lime & Transport Co. will build a stone crushing plant requiring 1500 tons. Detroit entered into competition with fabricators in bidding for the Belle Island Bridge, Detroit, requiring 3000 tons, the city's department of public works submitting the low bid. The Baldwin reservoir and filtration plant, Cleveland, will require 1500 tons of reinforcing bars. The Lackawanna Steel Co. has taken 500 tons of rails for the Cleveland Railway Co.

Sheets.—The Ford Motor Co. is inquiring for 4000 tons of steel for car frames for early shipment. The inquiry includes some light plates, but the bulk of the tonnage wanted is in blue annealed sheets. New demand for sheets is very light. This is partly attributed to the fact that most consumers bought before the recent advance in prices by independent mills and some others are waiting to see if present prices hold. So far there are no reports of shading of these prices at which small lot sales have been made.

Cleveland warehouses quote steel bars and small shapes at 2.99c.; plates, 3.09c.; structural shapes, 3.09c.; No. 9 galvanized wire, 4.45c.; No. 9 annealed wire, 3.75c.; No. 28 black sheets, 4.80c.; No 28 galvanized, 5.70c.; No. 10 blue annealed, 3.85c. to 4c.; hoops and bands, 3.69c.; shafting, 4.25c.

Coke.—The market is very dull with sales limited to car lots of foundry coke. We quote standard makes of Connellsville foundry coke at $5 to $6 per net ton at oven.

Bolts and Nuts.—The demand for bolts and nuts has improved owing to the fact that many consumers are running out of certain items and are buying small lots to fill in their stocks. With the last readjustment of prices, the price situation has cleared up and sellers seem determined to adhere to established prices. Small lot orders for rivets also show an improvement. While makers are generally adhering to regular prices, there are unconfirmed reports that these prices are being shaded $2 a ton.

Old Material.—There was considerable revival of activity in the scrap market during the week as a result of several mills coming into the market and some of the dealers look for a moderate buying movement during the next week or two, basing their prediction on the statement that present prices are so low that it is a good time for mills to buy. With the springing up of some demand, prices on heavy melting steel and several other grades have stiffened somewhat. A Cleveland mill purchased 3500 tons of shoveling turnings at $8.50. Two Valley mills and a southern Ohio mill made purchases of heavy melting steel, compressed steel, borings and turnings. A Canton mill is again accepting shipments which it had held up for several months. As a result of buying by mills, there is some demand from dealers for heavy melting steel at $13 for Youngstown delivery.

We quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$11.00 to $11.50
Steel rails under 3 ft	13.50 to 14.00
Steel rails, rerolling	14.00 to 15.00
Iron rails	13.00 to 14.00
Iron car axles	20.00 to 21.00
Low phosphorus melting scrap	13.00 to 14.00
Cast borings	9.00 to 9.50
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	9.00 to 9.50
Compressed steel	10.00 to 10.50
Railroad wrought	13.00 to 14.00
Railroad malleable	13.00 to 14.00
Light bundled sheet stampings	5.00 to 6.00
Steel axle turnings	10.00 to 10.50
No. 1 cast	18.00 to 19.00
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	15.00 to 15.50
Stove plate	15.00 to 15.50
Pipes and flues	7.00 to 8.00

St. Louis

ST. LOUIS, April 25.

Pig Iron.—Although the quotation on pig iron, No. 2 Southern, Birmingham basis, continues at $23 there is not enough business stirring to confirm that or any other figure as a real price in this market. One sale of 100 tons by the new Granite City furnace is reported on a basis of $26.50 Granite City. No sales have been made recently by the West Side furnace, which is shut down. The only inquiry in the market is for 100 tons, but it has not been closed. The foundries are operating 2 to 3 days per week with a half force or less, rendering the output still only about 25 per cent of normal. Most of this is on repair work with no large new business appearing. The stove molders have been awaiting the results of the scale negotiations and it is hoped that as reductions have been agreed upon, there will be increased activity. Had no reduction been agreed upon, most of the stove molders would have closed their plants. Only a part of these concerns on this side of the river are now operating and that only on needed parts while in Belleville a similar state of affairs exists.

Coke.—Very little new business is appearing in coke, in consonance with the situation in the iron market. One 100-ton inquiry is reported and a rumor of a 1000-ton sale has interested the market, but it cannot be confirmed. Connellsville 72-hr. coke is quoted at $5.75 to $7 according to delivery and other conditions. No by-product coke is selling.

Finished Iron and Steel.—Finished products, while evidencing a better tone among the consumers, have not shown any new business, although some is expected as soon as projects can be considered in the light of the new prices. Some small specifications for fabrication are being placed, chiefly with the warehouses, but these do not run into any serious tonnages.

San Francisco

SAN FRANCISCO, April 20.

Pig Iron.—The Coast situation remains quiet and the market presents a rather unsettled appearance, probably due in large measure to the presence of moderate quantities of Chinese and Belgian material, which in fairly normal times would scarcely be noticed. But with foundry operations restricted to small jobbing orders for current needs, there is no real demand for pig iron, especially as most foundries are liberally supplied, so that these foreign offerings are something of a drug

on the market, tending to depress the general tone. Moreover, a considerable part of the Chinese foundry iron, particularly, is of poor quality with a high phosphorous content, and is being offered from about $30 to $33, delivered. One lot was reported delivered Los Angeles at $29. Around 500 tons are said to be afloat from the Orient. Low grade Belgian pig has been offered at $30, but higher quality ranges from $31 to approximately $34, with little actual business resulting. The lowering of the export rate from Birmingham by railroads to 65c. per 100 has not yet exerted any influence.

Coke.—Under prevailing conditions in pig iron, there is very little activity in this market. Foundries generally are well provided for, and no new business of consequence has transpired, other than routine lots for immediate requirements. During the past two weeks, one large interest reports an aggregate of about 1000 tons, which moved at approximately $22 net ton, delivered San Francisco. This price is about $1 lower than for the preceding period.

Old Material.—Mill operations are practically at a standstill, and the market continues in a comatose state with no signs of a revival perceptible. No changes in prices have been made, heavy melting steel being freely offered at $12 gross ton delivered at the mill, and cast iron scrap at $30. Under the general stagnation in business, stocks are accumulating in mills and in dealers' yards. A rather unusual event occurred recently when a quantity of scrap from South China was offered here at $15, which seems to indicate that the Orient is inactive under a surplus.

Cast Iron Pipe.—After a fortnight of relative inaction, business in pipe has revived considerably and during the past week or ten days several fairly important inquiries have been received and transactions have been made, chiefly from municipal sources. Private operations are still rather light. Among the more interesting inquiries of recent date was one from Los Angeles for 239 tons of 8-in. cast iron pipe, which contract was awarded to the American Cast Iron Pipe Co. Bids for 500 tons of 4, 6 and 8-in. pipe for Lodi, Cal., will open April 25.

Finished Iron and Steel.—General conditions on the Coast are virtually no more encouraging than at the first of the month, the situation remaining quiet and unsettled. The cut made by the Columbia Steel Co., on reinforcing bars to $2.35, mill California, has brought a fair volume of business, practically all offering, for competitive interests have not met this price, one quoting as high as $3.25 for 100-ton lots. There has been a small movement in merchant bars at about $3.15, San Francisco. It is expected that the Steel Corporation's reduction will tend to stabilize the market and stimulate buying, but no such effects have become apparent. The Orient continues to be an unfavorable outlet for American steel products, due to the undercutting of Belgian bars, the heavy stocks on hand, and the general disrupted conditions existing in those markets.

Not Very Friendly to the United States

W. A. Beecher, vice-president of the Mahoning National Bank, Youngstown, Ohio, and director of the Powell Pressed Steel Co., Hubbard, Ohio, who has just returned from a trip through Brazil, Argentina, Uruguay, Chile and Peru with a party of bankers, states that the feeling of the people of South America is not altogether friendly toward the United States. Organized propaganda is being directed against American business in South America, he states, and furthermore the business methods during the war, principally the failure to deliver goods according to contract, are responsible for the unfriendliness of business interests.

"Conditions are virtually the same in South America as here, as they affect business," he states. "They are depressed, largely due to the depreciation of the English pound, on which they base their currency. The costs of living are not any higher, if as high, as in the United States, while wages are low. Large quantities of goods are tied up in the wharves and warehouses of South American ports, because they do not have the money to pay for them. In Buenos Aires alone, 4000 automobiles are boxed up."

Chicago

CHICAGO, April 26.

The stabilization of prices had a double effect on the mills, the effect on the independents being the reverse of that on the leading interest. It develops that a respectable tonnage which has been pending was closed by the independents at the price which prevailed before the recent advances and that because of the concentration of buying at that time, there is for the time being little new business in the market. At the same time the mills have enough specifications to keep their mills going at a fairly comfortable rate for two or more weeks. The leading local independent, for example, is now employing about 50 per cent of its rolling capacity with prospects of maintaining that operation until the end of next week. Other local independents are running at about the same rate as last week, or an average of about 40 per cent. A few mills in this territory are still idle, these being principally bar iron and hard steel bar mills.

Up to date the steel mills are adhering strictly to the new quotations, but what will happen when they have reached the end of their present backlog is a question. It is possible that by that time demand will revive and in this connection it is to be noticed that certain classes of users are showing more interest in the market than heretofore. Reinforced concrete construction companies are commencing to reach the bottom of their stocks and have placed a few new orders for bars, one of them being for 1000 tons.

Whereas the independents have as yet done little business at the new prices, the Illinois Steel Co. has had a fair tonnage reinstated, some of it being in track fastenings and wheels for the railroads and some of it bars for the automobile industry. At the same time, the reduced track fastening prices have brought out a number of new orders, the largest being 8000 tons of tieplates for the Rock Island. These bookings, however, have not yet affected operations which are the same as last week.

Pig Iron.—That conditions in foundries in this district are slowly but steadily improving is indicated by the fact that the shipments of the leading Northern merchant for the month of April will exceed those of March by 30 per cent, and shipments in March, as previously stated in this column, were one-third larger than those of February, which were the smallest in several years. The operations of melters in Michigan, although by no means uniform, are larger than those of foundries in other States in this territory. Contracts for automobile castings are being let and while this work is not being evenly distributed, it has been reflected in a fair number of orders for pig iron for prompt shipment. The foremost local merchant has recently booked several thousand tons in orders and releases of suspended tonnage from foundries serving the automobile industry. On the other hand, melters making sanitary ware, radiators and other house appurtenances are in most cases curtailing operations, although an exception is to be noted in one Wisconsin manufacturer of sanitary ware who is running full. The reason for this restriction in output lies in the fact that these commodities must be made several months in advance of the demand and that the prospects of a building boom, which seemed bright several weeks ago, are now clouded by the likelihood of labor difficulties. Although shipments from furnace are undeniably better, the improvement has been insufficient to affect the status of furnace operations. Of the merchant furnaces in the Chicago district and in Wisconsin, only three are active, one Mayville stack, one Federal and one Iroquois, the last named now being on Bessemer for the Mark pipe mills. The Federal furnace will probably be blown out soon unless the complexion of the market takes a marked change. Buying during the past week has been on a somewhat more generous scale than a week ago, the tendency of users to confine their purchases to carloads being less evident. An Illinois melter bought 600 tons, two-thirds malleable and one-third foundry, for May and June shipment, at $24 base, Chicago. A Minnesota jobbing foundry employed on

railroad work bought 200 tons of malleable on the same terms and another melter in the same State doing farm-implement work purchased 200 tons of charcoal at $35 furnace. A user with a purchasing office in Chicago has closed for 200 tons of Southern foundry at $23 base, Birmingham. Delivery is to be made at a plant south of here, so that the freight will not mount to the high figure on shipments from Birmingham to Chicago. Nevertheless, the freight advantage is with Chicago furnaces, and the purchase was made because Southern iron was wanted in the mixture.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton:

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$38.50
Northern coke, No. 1 sil. 2.25 to 2.75	24.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	24.00
Northern high phos	24.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	32.67
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	30.92
Southern foundry, sil. 1.75 to 2.25	29.67
Malleable, not over 2.25 sil.	24.00
Basic	24.00
Low phos. Eastern furnace, sil. 1 to 2 per cent copper free	36.50
Silvery, sil. 8 per cent	40.00

Ferroalloys.—Interest is manifested in the proposed tariff on importations of ferromanganese. Some users are apprehensive that a tariff will cause an advance in the market.

We quote 75 to 80 per cent ferromanganese, $90 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $38.50 to $39 delivered.

Plates.—The letting of 12 tanks by the Standard Oil Co. for Casper, Wyo., concerning which there was some doubt a week ago, has been confirmed, the fabrication having been awarded to the American Bridge Co. The steel, principally plates, amounting to about 3100 tons, will be rolled by the Illinois Steel Co. The remaining 12 storage tanks on which the oil company asked figures will not be constructed. In general, the market is quiet and the new prices are being adhered to.

The mill quotation is 2.20c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.23c. for plates out of stock.

Structural Material.—Local building prospects are clouded by the likelihood of a lockout of the building trades unions on May 1. In other parts of the West, however, a moderate amount of fabricating work continues to be let. Mill prices on plain material are holding. Recent lettings include:

Standard Oil Co., 12 storage tanks, Casper, Wyo., 3100 tons, to American Bridge Co.

Security Trust & Savings Bank Building, Hollywood, Cal., 300 tons, to Baker Iron Works.

Six highway spans, Jackson County, Iowa, for State Highway Commission, 225 tons, to Northwestern Bridge & Iron Co.

Hinde & Dauch Paper Co., Fort Madison, Iowa, 600 tons, to Worden Allen Co.

St. Louis Southwestern Railroad bridge, 292 tons, to unnamed fabricator.

Pending inquiries include:

Atchison, Topeka & Santa Fé Railroad, blacksmith shop, San Bernardino, Cal., 262 tons.

Corn Products Refining Co., new plant unit, North Kansas City, Mo., 800 to 1,000 tons.

American Coating Mills Co., coating mill, Elkhart, Ind., 100 tons.

The mill quotation is 2.20c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.23c. for materials out of warehouse.

Bars.—The reduction by the Illinois Steel Co. resulted in bringing out releases of moderate tonnages from the automobile industry and miscellaneous sources, but taken as a whole, bookings of mild steel bars still remain far below normal. It is encouraging, however, to note that some of the concrete reinforcing construction companies are getting numerous small building contracts and are commencing to reach the bottom of their stocks of steel. One of these companies has placed an order for 1000 tons of bars with the leading mill. Moving picture houses, schools and other non-industrial jobs predominate in the lists of work taken by these interests. The Corrugated Bar Co., for instance, has been awarded contracts for 104 tons for a high school at Fondulac, Wis., 50 tons each for the Regent Theater, Grand Rapids, Mich., and the First National Bank, Marion, Ind., and 30 tons for the Peoria, Ill., Country Club. The mills continue to receive moderate orders for reinforcing bars for State highway work, particularly from Iowa. Bar iron buying is light and aside from a few purchases by fence post manufacturers and bed spring makers, there are practically no orders for rail carbon steel bars.

Mill prices are: Mild steel bars, 2.10c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2.38c. to 2.43c., Chicago; rail carbon, 2.25c. mill or Chicago.

Jobbers quote 3.13c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.63c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.88c. base.

Sheets.—The market remains quiet, less tonnage, if anything, coming from the automobile plants. The Far East continues to buy light sheets, the bookings of the local independent averaging about 500 tons a week. The placing of considerable business at lower quotations just before the advance gave most of the mills a fair backlog, sufficient to insure more or less satisfactory operations for two or more weeks. Although orders at the new quotations are few, there are no reports of price cutting.

Mill quotations are 4c. for No. 28 black; 3.10c. for No. 10 blue annealed and 5c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 4.13c.; No. 28 black, 5.40c.; No. 28 galvanized, 6.40c.

Wire Products.—The recent reductions by the leading interest have brought it increased business from some sections as well as releases of old orders. Of the various wire products, nails are most sought for, although barbed wire and plain wire are also in demand. The season for poultry netting is about over. The American Steel & Wire Co. has reduced miscellaneous nails which are quoted on a discount basis a little over 10 per cent and has cut track spikes to a base of 3.40c., Pittsburgh. On the whole, demand remains subnormal. For prices see finished iron and steel, f.o.b. Pittsburgh, page 1045.

Rails and Track Supplies.—The Illinois Steel Co. has reduced its prices on light rails and track fastenings, the new prices being 2.20c. f.o.b. mill, on light rails, 3.40c., Pittsburgh, on track spikes, 4.35c., Pittsburgh, on track bolts and 2.50c. Chicago, on tie plates, the price of steel angle bars remaining unchanged at 2.75c., Chicago. With the announcement of the new quotations, a number of roads reinstated good-sized orders for bolts, spikes and angle bars, among these lines being the Burlington, Illinois Central and the St. Paul. Some new business was also placed, the largest order being 8000 tons of tie-plates for the Rock Island. Iron tie-plates are to be had at from 2.50c. to 3c., mill.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 2.20c. f.o.b. makers' mills.

Standard railroad spikes, 3.40c., Pittsburgh; track bolts with square nuts, 4.35c., Pittsburgh; steel tie plates, 2.50c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.50c. to 3c., f.o.b. makers' mills.

Bolts and Nuts.—Some makers have booked a fair amount of business of late, but most of it represents the closing of inquiries on which the lower prices prevailing before the recent advance had been quoted. A jobber, for example, ordered 1,000,000 bolts and an Illinois manufacturer bought 350,000 plow bolts in two sizes. Among orders which have been taken at the new prices may be mentioned one from a Minneapolis jobber which calls for a carload of machine and carriage bolts. A number of large inquiries are expected to be issued by Detroit auto makers. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1045.

Jobbers quote structural rivets, 4.53c.; boiler rivets, 4.63c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 45 off; carriage bolts up to ⅞ x 6 in., 40 off; larger sizes, 40 off; hot pressed nuts, square and hexagon tapped, $2.10 off; blank nuts, $2.60 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off. Quantity extras are unchanged.

Cast Iron Pipe.—Detroit has rejected bids on 20,600 tons. Although the lump bids on the entire job showed concessions of a few dollars per ton, the tonnage was large and over half of it called for 48-in. pipe, which is

considered very desirable from the standpoint of the makers. Generally speaking, prices are holding rather firmly, the concessions made being insignificant. Michigan City, Ind., will not purchase the pipe on which it recently took bids. Akron, Ohio, which recently took figures on 1060 tons of pipe and 60 tons of specials, placed only 250 tons with the National Cast Iron Pipe Co., but is expected to take bids again on about 1750 tons on May 13. Blackfoot, Idaho, which advertised for 1200 tons, let one-half of the tonnage in Matheson steel joints to the Wheelright Construction Co., Ogden, Utah, and the remainder in cast iron pipe to the Colorado Fuel & Iron Co., which has a decided freight advantage over its competitors. Other lettings include:

Detroit Board of Fire Commissioners, 645 tons of high pressure pipe to United States Cast Iron Pipe & Foundry Co.

Toledo, 512 tons to National Cast-Iron Pipe Co.

Saginaw, Mich., 200 tons to Lynchburg Foundry Co.

Rochester, Mich., 157 tons to American Cast-Iron Pipe Co.

Fond du Lac, Wis., 107 tons to American Cast-Iron Pipe Co.

New work includes:

Springwells, Mich., 1250 tons of 6- to 24-in., bids to be taken April 26.

Medina, Ohio, 180 tons, 4-in. to 6-in., April 26, to be let to contractor who will sublet.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $69.10; 6-in. and above, $64.10; class A and gas pipe, $4 extra.

Warehouse Business.—Steel boiler tubes have been reduced 3.25c. a foot to 43.25 a foot for 4-in. lap weld and have cut 10.25c. a foot to 64c. a foot on 4-in. seamless. Charcoal iron boiler tubes have been reduced 5.50c. to 64c. a foot. An extra 50c. per 100 lb. for flats, squares and hexagons has been added to the base price of 4.63c. per lb. on cold-rolled steel rounds. Cold-rolled strip steel has been cut 25c. to $7.65 per 100 lb. base. Hoops and bands have been reduced 5c. to $3.78 per 100 lb. Structural and boiler rivets have been reduced 35c. per 100 lb. to $4.53 and $4.63 respectively. Hot-pressed nuts tapped are quoted at a discount of $2.10 and blank at $2.60 off. Black annealed wire is quoted at 4.13c., bright basic No. 12 and heavier, 4.28c., and No. 13 and lighter 4.68c. On hard and medium deformed steel bars, warehouses are holding firmly to 2.88c. per lb.

Old Material.—Consumers are buying little but dealers in anticipation of better demand are bidding against each other for railroad material which they are stocking in their yards. Thus present buying prices on a number of commodities have advanced under the stimulus of speculative purchases. Railroad lists include the Burlington, 3500 tons, the Pennsylvania Northwestern region, 800 tons, the Great Northern 4200 tons, and the Lake Erie & Western a blank advertisement.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.50 to $18.00
Relaying rails	30.00 to 35.00
Car wheels	14.25 to 14.75
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft.	13.50 to 14.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.50 to 8.00
Hydraulic compressed sheet	9.00 to 9.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	15.50 to 16.00
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	22.50 to 23.00
Steel car axles	14.00 to 14.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Cut forge	9.50 to 10.00
Pipes and flues	7.00 to 7.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.50 to 10.00
Steel knuckles and couplers	11.50 to 12.00
Coil springs	12.00 to 12.50
No. 1 cast	13.50 to 14.00
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	5.00 to 5.50
Cast borings	6.50 to 7.00
Stove plate	12.50 to 13.00
Grate bars	10.00 to 10.50
Brake shoes	9.50 to 10.00
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

British Iron and Steel Market

Scotch Furnaces All Down—Steel Works Suffer from Continental Competition

(By Cable)

LONDON, ENGLAND, April 25.

Conditions are unaltered from last week. All Scotch pig iron furnaces have now been blown out. Number 3 Cleveland pig iron is in good demand, some makers now asking £6 10s. ($25.67). India bought 3000 tons, and makers are holding heavy stocks of forge iron, which is unsalable at present prices. Official quotations are unchanged. Hematite is unaltered and the market is practically idle.

In steel the position is worse. Most of the steel works are closed and continental competition is keen. Belgian bars have been sold at £8 10s. ($33.57) f.o.b. Belgium. This price secured a Dutch order of 7000 tons of railroad materials. India also has bought fair lines from the continent.

Welsh tin plate manufacturers are anticipating a grim and protracted struggle, owing to the bitter feeling among the Welsh miners. Tin plate consumers have bought fair lines of stock plates and wasters. Tin plate workers' wages for May to July have been reduced 18 per cent. Production cost is now 30s. ($5.92) per basis box.

Galvanized sheets have been sold to India at £22 ($86.90). Other business is probable, but buyers are stipulating a guarantee of early shipment, which the works find impossible to meet. Belgium has sold to Japan specifications black sheets at £22 ($86.90) f.o.b. Few orders are coming here.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.95 per £1 as follows:

Durham coke	£2	14½			$10.86	
Cleveland basic	6	0			23.70	
Cleveland No. 1 foundry	6	5			24.69	
Cleveland No. 3 foundry	6	0			23.70	
Cleveland No. 4 foundry	5	19			23.50	
Cleveland No. 4 forge	5	17½			23:21	
East Coast mixed	9	0 &	£8	5*	35.55 &	$32.59
Ferromanganese	19	0 to	20	0	75.05 to	79.00
Ship plates	17	0 to	19	0	67.15 to	75.05
Boiler plates	24	0 to	25	0	94.80 to	98.75
Tees	16	0 to	18	10	63.20 to	73.07
Channels	15	5 to	17	5	60.24 to	68.14
Beams	15	0 to	17	10	59.25 to	69.12
Round bars, ¾ to 3 in.	15	10 to	16	10	61.22 to	65.17
Rails, 60 lb. and up	15	0			59.25	
Billets	13	to	14	0	51.35 to	55.30
Sheet and tin plate bars, Welsh	12	15 to	13	0	50.36 to	51.35
Galvanized sheets, 24 g.	22	0 to	22	10	86.90 to	88.87
Black sheets	20	0 to	21	0	79.00 to	82.95
Tin plate base box	1	9 to	1	12	5.73 to	6.32
Steel hoops	17	10 to	20	0	69.12 to	79.00

*Export price.

The Engineers' Club of Seattle, Wash., Arctic Building, Seattle, is desirous of extending the privileges of its club to the members of engineers' clubs and associations of other cities while such members are visiting or temporary residents of Seattle. It is desirous of ascertaining the particulars of organization, such as personnel of officers and numbers of members, of various local engineering associations. Lyman T. Banks, Northwest representative of the Wheeling Steel Products Co., is secretary of the club.

Great activity in Alaska oil prospects is evidenced all along the Western coast from Admiralty Inlet to Juneau. Construction work on half a dozen prospects will be under way by June 1. The general drift of men into Alaska has totaled 2500 for the spring season to date.

The new sheet mill of the Milwaukee Rolling Mill Co., Milwaukee, started up last week, working three 8-hr. shifts, with 200 men per shift.

JAPANESE PRICES DECLINE

Off About 10 Per Cent—Export Buying Light—Five Locomotives Wanted for Mexico

NEW YORK, April 26.—Inquiries continue from Japan, China, India, Mexico and South American markets but little buying is reported. Although Japanese inquiries continue, purchases are not as heavy as a few weeks ago. One exporter in New York recently booked an order for 400 tons of black sheets of medium gage for shipment to Japan. The contract for 20 miles of water pipe and 20 miles of oil pipe for the Tampico oil fields in Mexico, which was recently placed with the Argos Steel Products Corporation, will total about $2,500,000. The Standard Service Corporation, 332 Singer Building, New York, is in the market for five used or rebuilt, standard gage, oil burning locomotives for freight service in Mexico. Specifications stipulate 200 lb. pressure and 4000 lb. traction on level track.

Japanese Prices

The price situation in Japan continues depressed, prices of iron and steel having registered a decline of about 10 per cent on April 21 from the quotations prevailing on April 15. Iron and steel producers in Japan, who have been forced to curtail operations in the present sluggish market and are holding stocks of finished material totaling almost 100,000 tons, are seriously considering further price cuts to meet the quotations on products from Continental sources and in some instances on American materials. With pig iron now quoted at 55 yen ($26.53, with the yen at 48.25c.) sellers in Japan are in a position to offer iron c.i.f. American Pacific Coast ports at considerably less than the cost to Pacific Coast consumers of Eastern iron. With freight rates from Birmingham to San Francisco at 65c. per 100 lb. and quotations of $23 per ton furnace on foundry iron, American pig iron would cost $37.65 delivered against about $31.53 per ton, c.i.f. port for Japanese iron. The following comparison shows the extent of the recent price decline in Japan:

Prices per Gross Ton

	April 21		April 15	
	Yen	Dollars	Yen	Dollars
Bars	107.50	51.86	122	58.86
Shapes	150	72.37	155	74.78
Plates	98	47.28	105	50.66
Sheets:				
Blue annealed, No. 10	164	79.13	178	85.88
Black, No. 28	187	90.22	190	91.67
Galvanized, No. 28	390	188.17	390	188.17
Tin plate, per box	14	6.75	14	6.75
Wire, galv. No. 8	165	79.61	172	82.99
Wire nails, per 100 lb.	12.80	6.18	12.80	6.18
Pig iron	55	26.53	55	26.53

The new tariff changing the present specific duty on iron and steel to an ad valorem duty, which has been pending for some time in the Imperial Japanese Diet is reported passed and will probably be in effect after May 1. The average increase in revenue from iron and steel importations will be about $5 per ton under the new law. Shipbuilders and other consumers of iron and steel doing government work will be subsidized for importations of material unobtainable from domestic sources.

Copper Purchases for Chinese Coinage

The recent heavy purchases of copper by Japanese buyers, which are understood to have been placed in this country at about 12⅞c. per lb., will probably be transshipped to Shanghai and Hangkow, China, for minting into copper coins. The Japanese copper market is being held up to about $350 per ton by dealers with heavy, high priced stocks, said to total about 50,000 tons. Bids recently submitted on the balance of the copper purchase to be made are believed to be in the neighborhood of 12¾c. per lb. base.

Some buying is being done by the Japanese in Belgium and France where deliveries are more certain than in Germany, although even with the present 12 per cent export tax imposed on German exports, prices are lower than in other markets.

STEEL CORPORATION EARNINGS

Poor Showing for the Quarter With Sharp Decline Since the First of the Year

The report of the United States Steel Corporation for the first quarter of 1921 shows the smallest net earnings since the second quarter of 1915, being $32,286,722 for the quarter ending March 31, 1921, compared with $27,950,055 for the second quarter of 1915 and $43,877,862 for the fourth quarter of 1920. The rapid decline in earnings during the quarter is shown by the fact that the earnings for January amounted to $14,387,000 and in March only to $7,741,352. The net earnings for the quarter and the preceding three years were as follows:

Quarters	1921	1920	1919	1918
First	$32,286,722	$42,089,019	$33,513,384	$56,961,424
Second	.....	43,155,705	34,331,301	62,557,391
Third	.....	48,051,540	40,177,232	42,961,589
Fourth	.....	43,877,862	35,791,302	36,354,165
Net earnings each year	.....	$177,174,126	$143,813,219	$198,834,569

The usual dividends of 1¾ on preferred and 1¼ on common were declared. The statement of the earnings for the quarter ending March 31 is as follows:

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary panies' Bonds Outstanding	Balance of Earnings
January, 1921	$15,073,067	$685,593	$14,387,474
February, 1921	10,842,031	684,135	10,157,896
March, 1921	8,426,908	685,556	7,741,352
	$34,342,006	$2,055,284	
Net earnings			$32,286,722
Less, charges and allowances for depreciation and sinking fund			11,630,383
Net income			$20,656,339
Deduct: Interest for the quarter on U. S. Steel Corporation bonds		$4,975,734	
Premium on bonds redeemed		205,000	
			5,180,734
Balance			$15,475,605
Dividends on stocks of the United States Steel Corporation, viz:			
Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658,700
Balance of surplus for the quarter			$2,816,905

Canadian Scrap Market

TORONTO, April 25.—Practically no change has appeared in the Canadian scrap metal market for several months and generally speaking buying is confined to the immediate requirements of consumers and dealers are buying only when they are in need of a certain line or see an exceptional bargain. Steel plants are entering the market at intervals for heavy melting steel, but they are not anxious to buy except for their immediate needs and as there appears to be a considerable quantity of the material in the country, there is much haggling over prices and mills are putting up propositions to the dealers whereby they can buy at prices below the actual cost of the material to the dealer and consequently there are few sales being made. No. 1 machinery scrap is in fairly good demand, but dealers are unable to secure large quantities of the material as there is little offering. Stove plate is also hard to pick up and dealers are unable to meet all requirements. Car wheels and grate bars are beginning to take on a little life, but in these consumers only buy what they want for present use or enough to carry them along for a couple of weeks. Other grades of iron and steel scrap are moving, but that is about all, and in most lines the market is in a state of stagnation. Toronto dealers are paying the following prices for iron and steel scrap, gross tons:

Heavy melting steel, $14; axles, wrought iron, $20; rails, $15; boiler plate, $10; steel axles, $25; carwheels, iron, $25; No. 1 wrought scrap, $12; plate and shape shearings, $14; heavy breakable cast, $12; steel turnings, $8; machine shop turnings, $8; wrought pipe, $8; heavy axle turnings, $8; cast borings, $5.

The following are prices in net tons: No. 1 machinery cast, $25; malleable scrap, $15; stove plate, $20; grate bars, $17; standard car wheels, $22.

ACTIVITY IN MEXICO

Monterey Plant Booked for Nine Months—First Shipment on Railroad Contract Soon

Otto H. Kafka, president Argos Steel Products Corporation, 170 Broadway, New York, who recently returned from a business trip to Mexico with a $20,000,000 contract with the Mexican state railroads for rails and accessories, locomotives and passenger cars, states that he found the country in an unusually prosperous condition and a good demand for all kinds of iron, steel and machinery. The financial facilities available, however, are small, chiefly because the United States has not yet recognized the present Mexican government. "Mexico," says Mr. Kafka, "has only about $27,000,000 of paper. The balance of her currency is gold and silver and the national debt is but $600,000,000, which is exceedingly small in proportion to her natural wealth." As an example of the market there for iron and steel, Mr. Kafka cites the Monterey Iron & Steel Co., Monterey, which is booked with orders for nine months. The annual capacity of the plant is 150,000 tons, but since its organization in 1900 it has never operated at capacity. Germany, he says, is the only country that shows any evidence of trying to do active business with the Mexicans, practically all other sellers being restrained because their governments have not officially recognized the new administration.

The contract, which the Argos Steel Products Corporation has with the State railroads of Mexico, will cover a period of four years, shipments being made against orders. Bids are now being received by the company on the first shipment, which will include part of the rail tonnage and about 50 of the total of 300 locomotives. Payment is guaranteed by the entire revenue of the National Railways of Mexico and will be made against deliveries. The contract was signed by the appointed representative of the Minister of Railways and Communications of Mexico.

MORE BUYING

Moderate Improvement in the Youngstown District—Basic Sells at $22.50

YOUNGSTOWN, OHIO, April 26.—With over 50 per cent of the 105 sheet mills in the Mahoning Valley rolling this week, indications point to a temporary improvement in the sheet division of the industry. The Brier Hill Steel Co., the largest Valley sheet maker, has increased the number of active sheet mills from 10 to 16, while the Mahoning Valley Steel Co. has started its six-mill plant at Niles after a prolonged suspension. The general operating average for the Valley is at 40 per cent, virtually the same as the week before. One independent interest reports that the volume of new business recently booked has averaged in excess of 50 per cent of maximum production, both from domestic and foreign sources.

Opinion among independent producers is that a definite upturn in buying has developed, but one that will not be wholly free from periods of intermittency. Liquidation has progressed to the point where many who have been holding back for more stable conditions feel justified in going forward on a modest scale, some business interests report. There is no inclination, however, to believe that conditions will show large betterment suddenly, the sustained improvement being of a moderate nature.

Cost Readjustment

One of the largest independent steel interests believes that cost readjustment to a normal basis is all that is necessary to bring about business activity seldom equalled in this country. This interest feels that prices are now near the level on which they may be expected to remain for some time and there is nothing to prevent general resumption of business except failure on the part of the public to understand the situation. It is explained that readjustments have taken place in agriculture, in the textile industry and in the steel industry, partially in the building industry and that the railroads have made progress in this direction. "These readjustments have not affected the buying power of the public because they have been accompanied by a proportionate reduction in the cost of living," it is stated.

W. A. Thomas, former president of the Brier Hill Steel Co. and now a director and member of the executive committee, expresses the belief that conditions will approach normal by fall. Another independent executive states that steel buying is much improved over a month ago.

The general situation at the moment tends to dissipate the apprehension expressed in some independent quarters that the recent upturn in inquiry and in buying resulted from knowledge on the part of consuming interests that concession prices were to be withdrawn and they consequently came into the market for more than their current needs.

One of the largest purchases of pig iron in several months was recently made by the Sharon Steel Hoop Co., which closed for 5000 tons of standard basic at $22.50 per ton. The heavy accumulations by steel works interests continue to dominate the market.

The feature of the sheet market is the insistence for shipments on the part of automobile builders and the growing volume of business from this source. Makers of full-finished sheets are operating at 80 per cent of normal, as a consequence of this demand. Independents are quoting 5.50c. on full-finished output, thereby maintaining the 1.50c. differential over black sheets. Compared with the 1c. differential of the leading interest, the situation indicates that full finished sheet requirements permit maintenance of slight premiums. Sheet makers insist that there has been no shading on the recently named prices for blue annealed, black and galvanized, of 3.10c., 4c. and 5c. respectively.

Pittsburgh Iron and Steel Market

(*Continued from page* 1133)

below what could be done. All dealers would like to pick up some cheap material for throwing down on their yards, but they have not been especially successful for the reason that the more common disposition of producers has been to let the material accumulate rather than sell it at the prices which have been offered. Steel companies are beginning to realize that their recent bids have brought them no tonnages and in this connection it is interesting to note that one company here which recently offered $8 for machine shop turnings now is willing to pay $8.50. Dealers, generally, are quoting this grade of material at $9 minimum. It is doubtful if No. 1 heavy melting steel could be bought for less than $15 per gross ton, delivered, and some of the dealers who recently have been trying to buy tonnages at around $12 and $13 now realize that if they wish to obtain any tonnages they must pay at least $13 delivered for them.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola size	18.00 to 19.00
Rerolling rails, Newark and Cambridge, O.; Cumberland, Md.; Huntington, W. Va.; Franklin, Pa., and Pittsburgh	14.00 to 14.50
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	13.50 to 14.00
Railroad grate bars	13.00 to 13.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and heavier	18.50 to 19.00
Railroad malleable	12.50 to 13.00
Iron car axles	32.00 to 33.00
Locomotive axles, steel	28.00 to 29.00
Steel car axles	15.50 to 16.00
Cast iron car wheels	14.50 to 15.00
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.50 to 9.00
Sheet bar crop ends at origin	13.50 to 14.00
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Cast iron borings	9.50 to 10.50
No. 1 railroad wrought	13.00 to 13.50

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 70c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, $1; pipe, not over 8 in. in diameter, 85c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.20c.

Wire Products

Wire nails, $3.25 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 and shorter than 1 in., $2; bright Bessemer and basic wire, $3.00 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.00; galvanized wire, $3.70; galvanized barbed wire, $4.10; galvanized fence staples, $4.10; painted barbed wire, $3.40; polished fence staples, $3.40; cement-coated nails, per count keg, $2.85; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60½ to 63 per cent off list for carload lots, 59½ to 62 per cent for 1000-rod lots, and 58½ to 61 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$3.40 to $3.50
Large boiler rivets.....3.50 to 3.60
Small rivets.....60, 10 and 10 per cent off list
Small machine bolts, rolled threads, 60, 10 and 10 per cent off list
Same sizes in cut threads.....60 and 10 per cent off list
Longer and larger sizes of machine bolts..60 per cent off list
Carriage bolts, ⅝-in. x 6-in.:
Smaller and shorter, rolled threads..60 and 5 per cent off list
Cut threads.....50, 10 and 5 per cent off list
Longer and larger sizes.....50 and 10 per cent off list
Lag bolts.....65 per cent off list
Plow bolts Nos. 1, 2 and 3 head....50, 10 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜-in. x 4-in.:
Smaller and shorter.....50, 10 and 5 per cent off list
Longer and larger sizes.....50 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.00 off list
Hot pressed nuts, tapped.....$3.50 off list
C. p. c. and t. sq. or hex. nuts, blank.....$4.00 off list
C. p. c. and t. sq. or hex. nuts, tapped.....$3.50 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S....80 and 10 per cent off list
Same sizes S. A. E.....80 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....4.35c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size, or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $48; chain rods, $48; screw stock rods, $53; rivet and bolt rods and other rods of that character, $48; high carbon rods, $58 to $73, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.40 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3.40 base; 5/16-in., $3.40 base. Boat and barge spikes, $3.40 to $3.65 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4.35 base per keg of 200 lb. Tie plates, $2.50 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $12.30 per package; 8-lb. coating, I. C., $12.60; 12-lb. coating, I. C., $14.30; 15-lb. coating, I. C., $15.30; 20-lb. coating, I. C., $16.55; 25-lb. coating, I. C., $17.80; 30-lb. coating, I. C., $18.80; 35-lb. coating, I. C., $19.80; 40-lb. coating, I. C., $20.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.10c. from mill. Refined bar iron, 2.75c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+2½	+28½
¼ to ⅜	52½	26	½	27½	9½
½	56½	42	¾	33½	18½
¾	60½	48	1 to 1½	35½	20½
1 to 3	62½	50			

Lap Weld

2	54½	42	2	30½	16½
2½ to 6	58½	46	2½ to 6	33½	20½
7 to 12	54½	41	7 to 12	29½	16½
13 to 14	45	..			
15	42½	..			

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+10½	+43½
¼ to ⅜	48½	31	½	26½	14½
½	53½	42	¾	33½	19½
¾	58½	47	1 to 1½	35½	21½
1 to 1½	60½	49			
2 to 3	61½	50			

Lap Weld, extra strong, plain ends

2	52½	41	2	31½	18½
2½ to 4	56½	45	2½ to 4	34½	22½
4½ to 6	55½	44	4½ to 6	33½	21½
7 to 8	50½	37	7 to 8	24½	12½
9 to 12	45½	32	9 to 12	19½	7½

To the large jobbing trade an additional 1, 5 and 2½ per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	19½	1¼ in.	+10
2 to 2¼ in.	30	1¾ in.	List
2½ to 3 in.		2 to 2¼ in.	—10
3¼ to 13 in.	47	2½ to 2¾	—15
		3 to 3¼ in.	—16
		3½ to 4½ in.	—20

Carload Discounts on Standard Commercial Seamless—Cold Drawn

1 in.	56	2 to 2½ in.	17½
1¼ in.	49	2¾ and 4 in.	20
1½ in.	48	4½ to 5 in.	7½
1¾ in.	25		

Hot Rolled

3 to 4 in. 30

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	3.00	Nos. 11 and 12	3.15
Nos. 9 and 10		Nos. 13 and 14	3.20
(base)	3.10	Nos. 15 and 16	3.30

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.80	No. 28 (base)	4.00
Nos. 22 to 24	3.85	No. 29	4.10
Nos. 25 and 26	3.90	No. 30	4.20
No. 27	3.95		

Galvanized Black Sheet Gage

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	4.00	Nos. 25 and 26	4.70
Nos. 12 to 14	4.10	No. 27	4.85
Nos. 15 and 16	4.25	No. 28 (base)	5.00
Nos. 17 to 21	4.40	No. 29	5.25
Nos. 22 to 24	4.60	No. 30	5.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.80	No. 28 (base)	4.00
Nos. 17 to 21	3.85	No. 29	4.05
Nos. 22 to 24	3.90	No. 30	4.05
Nos. 25 to 27	3.95	Nos. 30½ and 31	4.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
April	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
20.....	12.75	12.50	30.25	4.25	4.25	5.20	4.70
21.....	12.75	12.50	31.00	4.25	4.25	5.30	4.80
22.....	12.75	12.50	31.12½	4.25	4.25	5.35	4.85
23.....	12.75	12.50	....	4.25	4.25	5.35	4.85
25.....	12.75	12.37½	32.25	4.25	4.25	5.40	4.90
26.....	12.75	12.37½	32.00	4.35	4.35	5.45	4.95

NEW YORK, April 26.

The improvement noted a week ago, while not rapid, continues in several of the markets. Demand for copper is not heavy and prices are a little easier. The tin market continues quiet but steady as to prices. There is no pronounced change in the lead market where demand is equal to production with prices firm. The improvement in the zinc market has been more pronounced than in any other and quotations are decidedly higher.

New York

Copper.—Japan continues to be a factor in the market, it being reported that buyers from that source are still considering the purchase of 2000 net tons. It develops that some of the business reported a week ago as having been sold to Japan went at least at 12.87½c., New York, which is slightly above the domestic market. Some of this metal is understood as destined for use in Chinese coins. There is no doubt also that the Western Union Telegraph Co., or at least wire producers, have purchased for the ultimate use of that company anywhere from 5,000,000 to 10,000,000 lb. of copper in the last week or two. While foreign demand in general is not as good as it was in March, it may be said that domestic demand is heavier than in that month but not large as a whole. There are still one or two sellers who, from a desire to convert copper into gold, are willing to sell and have sold recently as low as 12.62½c., delivered, or 12.37½c., New York, for April-May delivery, which we quote as the market. Some sellers announce a minimum of 12.75c., delivered, for June with future delivery around 13c., delivered, as the minimum. Lake copper continued in light demand with quotations from 13c. to 13.25c., delivered, depending on the position.

Tin.—The week has been a quiet one with practically no features, and conditions are much the same as have prevailed for some time. Sellers have been few and buyers also. In general there have been buyers at ¼c. to ⅛c. below the market, which have been contrasted with practically no concessions from sellers, neither side being anxious to do business. This practical deadlock has resulted in the lack of activity. Prices in general, however, are higher, spot Straits tin being quoted to-day at 32c., New York. The London market has also advanced in the week, prices to-day being £117 15s. for spot standard, £176 5s. for future standard and £180 17s. 6d. for spot Straits, with the Singapore price at £181 10s. These higher values as compared with a week ago are due partly to the advance in the pound sterling and a little buying by consumers here. Arrivals thus far this week have been only 665 tons with the quantity afloat reported as 1550 tons.

Lead.—The market is quiet and steady with consumption about equal to production, which is light. The leading interest late to-day advanced its price from 4.25c. to 4.35c., New York and St. Louis, which we quote as the market, but some independent sellers are asking 4.50c., New York, and 4.30c. to 4.35c., St. Louis; they are evidently selling only small quantities. Buying in any case is not heavy. Indications seem to be that any change in the tariff will be an advance in the duty, which is at present 25 per cent ad valorem.

Zinc.—Sellers report that inquiry from galvanizers has been heavier in the past week than in many months. Buying has also been heavier as a result of these inquiries. Some producers are maintaining an aloofness while others are meeting part of the demand. The result has been a decided strengthening in values so that prime Western to-day is quoted at 4.95c., St. Louis, or 5.45c., New York, at which business has been done for early delivery. Some quotations have been made as high as 5c., St. Louis. Brass special zinc has sold at 5.17½c.

Antimony.—Changed conditions in the Orient have been such that wholesale lots for early delivery are quoted at 5.25c., New York, duty paid.

Aluminum.—There is no change in this market, virgin metal, 98 to 99 per cent pure being quoted in wholesale lots for early delivery at 28c. f.o.b. plant, by the leading producer while the foreign metal of the same grade is offered by other sellers at 23c. to 23.50c., New York.

Old Metals.—Business is very quiet and transactions are hard to put through. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.00
Copper, heavy and wire	11.00
Copper, light and bottoms	9.50
Heavy machine composition	12.00
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	6.00
Lead, heavy	4.00
Lead, tea	3.00
Zinc	3.50

Chicago

APRIL 26.—Buying is light but tin and lead have advanced slightly while the other metals remain unchanged. Old metal prices are practically the same as heretofore, only red brass having changed, the present quotation being slightly under that which was previously named. We quote Lake copper at 13c. in carload lots; tin, 33.50c.; lead, 4.50c.; spelter, 4.75c. to 4.90c.; antimony, 7.50c. On old metals we quote copper wires, crucible shapes, 8c.; copper clips, 8c.; copper bottoms, 7c.; red brass, 7.50c.; yellow brass, 5.50c.; lead pipe, 2.75c.; zinc, 2c.; pewter, No. 1, 17c.; tinfoil, 19c.; block tin, 22c., all these being buying prices for less than carload lots.

St. Louis

APRIL 25.—The non-ferrous markets have continued quiet during the week with the quotations on car lots about the same as last week, lead being quoted at 4.25c. and spelter 4.75c. In less than car lots quotations are: Lead, 4.75c.; spelter, 5.50c.; tin, 35c.; copper, 14c.; antimony, 7.50c. Very little is doing, however, and these prices would probably be materially shaded in the presence of any real business. In the Joplin ore district prices of zinc blende and lead ore remained without material change, while calamine continues out of the market. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 4c.; heavy yellow brass, 6.50c.; heavy red brass, 8c.; heavy copper and copper wire, 9c.; light copper, 8c.; pewter, 13c.; tinfoil, 18c.; aluminum, 10c.; zinc, 3c.; lead, 3.50c.; tea lead, 2c.

Official records show that the foreign trade of the United States is about evenly divided between metric and non-metric countries and therefore furnish no basis for an argument in favor of a change to the metric system as against the retention of our present standards. Furthermore the tremendous growth of our foreign trade, with both metric and non-metric countries, would seem to indicate clearly that our present standards are able to take care of themselves in the markets of the world.

Extensive hearings on metric bills before Congress have been announced by the chairman of the House Committee on Coinage, Weights and Measures. The date is not given, but the chairman, who declined to call a meeting last session, appears now to be in favor of studying the details of the question.

Trade and Office Changes

The Detroit branch of the Strong, Carlisle & Hammond Co., dealers in machinery, is now located in its new office and warehouse at 1300 West Fort Street, Detroit. The company for five years has been located in the Dodge Building, 410 Jefferson Avenue. The new location will give the company 10,000 sq. ft. of space all on one floor, well lighted and located centrally to all freight depots. J. L. Whitehead is manager of the Detroit branch.

J. L. Kingston has purchased the interest of George Rethwisch in the sheet metal works of Rethwisch & Berry, Front Street, Bloomington, Ill., and hereafter the firm will be styled Berry & Kingston.

The Cincinnati Grinder Co. has recently placed the sale of its line of grinding machines on an exclusive basis with the Marshall & Huschart Machinery Co. in the Chicago district; Motch & Merryweather Machinery Co. in the Cleveland, Cincinnati, Pittsburgh and Detroit district; Henry Prentiss & Co. in the New York and New England district and will also maintain its own grinding specialists in the respective territories.

The Air Reduction Co., manufacturer of acetylene welding and cutting equipment, has leased the fourteenth floor of the Canadian Pacific Building, Madison Avenue, Forty-third to Forty-fourth streets, and will remove its executive offices now in the Equitable Building, 120 Broadway, and at 160 Fifth Avenue to the new location on May 1. The leased space totals 22,250 sq. ft.

The Coon-DeVisser Co. of Detroit, dealer in mechanical equipment, has moved into its new quarters at 1772 West Lafayette Boulevard, Detroit. A Taylor stoker service station, which will supply parts for Michigan, has been organized, with Thurlow E. Coon, president, and J. H. DeVisser, vice-president.

The Pittsburgh Crane & Equipment Co., Pittsburgh, has opened a sales office at 305 Broadway, New York, F. H. Crawford, manager.

The Pollak Steel Co. has established a warehouse at its Cincinnati plant, where a stock of concrete bars will be maintained. This is the first warehouse in Cincinnati devoted exclusively to concrete reinforcing bars.

A. R. Brown McFarlane & Co., Ltd., announce the removal of their office from 120 Broadway to 90 West Street, New York.

The Todd Shipyards Corporation announce the removal of its offices to 25 Broadway, New York.

Napier Saw Works, Inc., is now located at Middletown, N. Y., instead of Springfield, Mass.

The Gage Publishing Co., Inc., publisher of *Electrical Record*, *Electrical Export* and *Raw Material*, after having been located at 114 Liberty Street, New York, for 23 years, has moved its executive and editorial offices to the Printing Crafts Building, 461 Eighth Avenue, Thirty-third and Thirty-fourth streets. The Gage Publishing Co. was established 30 years ago.

The Minneapolis Steel & Machinery Co. will move its New York offices to suite 2908, Woolworth Building, effective May 1. The main export offices of the company will be located at the factories at Minneapolis. Shipping and collections will be looked after from the New York office. C. W. Hadden, manager of foreign sales, will make his headquarters at Minneapolis. J. A. Teach will remain in New York and will continue his duties as contracting engineer and designer of structural steel products for the domestic and export trade.

The Pressed Steel Car Co. will move its New York offices this week from 24 Broad Street to the new Seaboard National Bank Building, 55 Broad Street.

The Black & Decker Mfg. Co., Towson Heights, Baltimore, has moved its New York branch office, formerly at 141 Broadway, to the Printing Crafts Building, Eighth Avenue and Thirty-third Street. A service station has been established at the same address, with a factory trained mechanic in charge. A complete stock of parts will be carried. G. R. Lundane is manager of the New York territory and is assisted by E. I. Firestone and R. T. Watts. The Detroit branch office, formerly at 19 Selden Avenue, is now located at 27 Watson Street. The Detroit territory is in charge of C. G. Odell, who has had his headquarters in Detroit for the past year.

Owing to the death of L. C. Blancke, president and general manager L. C. Blancke Co., Inc., 10 Thomas Street, New York, high speed steel, a protective committee has been formed to decide the future policy of the business. This committee consists of: Clark S. Jennison, vice-president George W. Goethals & Co., Inc.; C. O. Moore, representing National City Bank; A. E. Erb, secretary L. C. Blancke Co., Inc.; A. G. Heller, vice-president Heller Bros. Co.

BOOK REVIEWS

American Business Methods for Increasing Production and Reducing Costs in Factory, Store and Office. By Floyd W. Parsons. Pages, 373, 5¼ x 8 in. Published by G. P. Putnam's Sons, New York.

Mr. Parsons was editor of *Coal Age*, New York, for a number of years. More recently, as a member of the staff of the *Saturday Evening Post*, he has written voluminously in that journal on "Everybody's Business." He has the faculty, not too common with men who make the pages of business journals, of writing interestingly. Many men have ability as writers, but those who are conspicuous for writing attractively and so as to arouse and maintain the interest of the reader are in the minority. Mr. Parsons is a member of this minority. He has imagination and enthusiasm, traits but little less essential to success in writing than in salesmanship.

The data on which the book is based have been gathered, the author says, from hundreds of leaders in industry. Much of it, obtained by research and in personal interviews, has been given in substance in articles heretofore published. The style of presentation is that which has attracted so many readers to the modern popular weeklies. In his preface the author says that "there are many splendid books covering definite and distinct phases of business procedure, but investigation fails to disclose any volume that attempts the ambitious plan of treating all of the important problems that underlie modern commercial and industrial practice."

The drift of the book will be indicated by the chapter headings which are, in order: Industrial Relations, Health and Industry, Light and Ventilation, Labor Saving Machinery, Advertising and Selling, Business Methods and Ideas, Foreign Trade Problems and Practices, Application of Science to Industry. The last chapter is the briefest, treating in 18 pages of the industrial use of the airplane, aerial photography, commercial uses of the X-ray and motion analysis in industry. In his chapter on Industrial Relations Mr. Parsons describes a bonus plan, various profit sharing plans and experiments in industrial democracy, the value of educating foremen, and other phases of modern shop relations.

Factory Organization and Administration. By Hugo Diemer, M.E., consulting industrial engineer. Pages, x + 398; 6 x 9 in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York.

After surveying the principles, methods and field of industrial management, Major Diemer discusses industrial finance, then moves on to organization and control which are further illustrated in chapters on typical factory organizations, factory accounts, and departmental reports. The factory itself is taken up, factory location, design of buildings, personnel department, office management, etc. The whole field is thoroughly covered in detail. He treats of rate fixing and time studies, wage systems and principles underlying good management in general. At the close of each chapter there are detailed references to other works treating of that particular subject. The final chapter is a bibliography of works management.

This is the third edition of a well known and appreciated work and brings the story of the development of industrial management down to date. The main additions are matter on general organization, personnel department and functional control of production.

The book naturally covers experiences with the more highly developed and large corporations which have been forced to improve their technique of management to avoid breaking down through the very clumsiness of their size, but there is matter of vital importance to both owner and employees of either large or small plant. The treatment is suggestive and not dogmatic.

J. J. R.

PERSONAL

Clyde E. Dickey has resigned as general manager of the Hammond Steel Co., Inc., Syracuse, N. Y., effective May 1. He is president of the Dickey Steel Co., Inc., 233 Broadway, New York, and will devote all of his time to this company in the future.

Harold Lockett, formerly associated with the Lumen Bearing Co., Buffalo, has become identified with the International Valve & Piping Co., Pittsburgh, in the capacity of manager of sales.

Claudis H. Huston, a business man of Chattanooga, Tenn., has been appointed Assistant Secretary of Commerce. Secretary Hoover had also selected another business man for the position of Director of the Bureau of Foreign and Domestic Commerce, but he found himself unable to accept the appointment.

Lawrence P. Crecelius and Victor B. Phillips, Cleveland, have become associated under the firm name of Crecelius & Phillips, and will engage in consulting, contracting and operating engineering, with offices at 1302 Hanna Building.

S. N. Clemons, for the past seven years assistant purchasing agent for the Northway Motor & Mfg. Co., Detroit, recently resigned to become general sales manager of the Midwestern Sales Corporation, 209 Chalmers Bldg., Detroit. The company will handle nuts and bolts, piston rings, screw machine parts, forgings and castings.

E. D. Shearman of Jamestown, N. Y., has been elected a director and secretary of the Collier Motor Truck Co., Bellevue, Ohio. Mr. Shearman was one of the original organizers of the Salisbury Wheel & Axle Co., Jamestown, and was its general manager until it was sold to Eastern interests in 1919.

George C. Tinsley has been elected general manager of the Commercial Shearing & Stamping Co., Youngstown. Mr. Tinsley has been connected with the company since its incorporation as secretary and sales manager, and was formerly with the Youngstown Sheet & Tube Co. and the Sharon Steel Hoop Co. Officers re-elected at this meeting are Robert Carnick, president; R. V. Proctor, vice-president; Jacob Carnick, treasurer.

W. J. Lynch, who has been special steel plant representative on installations of Holbeck powdered coal systems for the Bonnot Co., has been appointed district manager for the company in Chicago with offices in the Continental & Commercial Bank Building.

E. R. Swanson, formerly with the Duquesne Steel Foundry Co. and Commonwealth Steel Foundry Co., is now president of the Keokuk Steel Castings Co., Keokuk, Iowa, engaged in the manufacture of electric steel castings.

Norton H. Van Sicklen has been elected president and general manager of the Reliance Wheel Co., Youngstown, Ohio, manufacturer of a steel double disc wheel. The company is preparing to increase production and has under option a manufacturing plant equipped with the necessary machinery. Mr. Van Sicklen formerly headed the Van Sicklen Speedometer Mfg. Co., which was recently sold to the Stewart-Warner Corporation. He is known to the iron and steel trade as a former official of the American Steel & Wire Co. J. M. Crenan is director of sales of the Reliance company.

It has been informally announced that Walter E. Flanders, former chairman of the board and general manager of the Maxwell Motor Co., Inc., Detroit, will become associated with W. C. Durant in Durant Motors. What position he will occupy has not yet been announced.

F. W. Ruggles, founder of the Republic Motor Truck Co., Alma, Mich., a few days ago was the guest of about 100 Alma business men at a dinner. A silver loving cup was presented to Mr. Ruggles.

Frank L. Estep, of the firm of Charles Page Perin and Stewart M. Marshall, consulting engineers, New York, sailed for England on Saturday, April 23.

Charles L. Newcomb celebrated, on April 21, the 40th anniversary of his connection with the Holyoke (Mass.) Deane Works of the Worthington Pump & Machinery Corporation. Coming to the plant in 1881 as superintendent of the Deane Steam Pump Co., he has been largely instrumental in building up to its present dimensions the plant of which he is now manager. Mr. Newcomb was actively concerned with the early activities of the National Founders' Association and the National Metal Trades Association, in both of which he has held office. He has been president of the New England Foundrymen's Association and is a manager of the American Society of Mechanical Engineers, of which he has been an active member since 1883—three years from its inception. Mr. Newcomb was presented with a silver tablet as testimonial of the esteem of his fellow workers in the Deane organization.

H. M. Davison has again become associated with the Hayward Co., New York, and will be connected with the management, among other duties having the general management of sales. From 1903 to 1919 he was with the Hayward Co., manufacturer of orange-peel, clam-shell, electric motor clam-shell and drag scraper buckets, and for two years just past was general sales manager for the Ohio Locomotive Crane Co.

James Hartness, president Jones & Lamson Machine Co., Springfield, Vt., but also Governor of Vermont, was awarded the John Scott medal at a meeting of the American Philosophical Society in Philadelphia, April 23. The award was made in recognition of Mr. Hartness' "flat turret lathe, used in making artillery." The medal is provided for by a fund established by John Scott, Edinburgh, Scotland.

Shiras Morris, president and treasurer Hart & Hegeman Mfg. Co., Hartford, Conn., electrical devices, has been made president of the Johns-Pratt Co., that city, steam packings, insulating material for electrical apparatus and electrical protective devices, to succeed the late Edward B. Hatch. Arthur W. Fox, assistant treasurer Johns-Pratt Co., is secretary and factory manager, succeeding Robert C. Buell, resigned. Mr. Morris is vice-president and treasurer H. T. Paiste Co., Philadelphia, and a director of the Bush Mfg. Co., Terry Steam Turbine Co. and two Hartford banks.

Harold Aspinwall, general foreman Department 200, the Stanley Works, New Britain, Conn., has been made superintendent of mill of the Stanley Steel Co., Hamilton, Ont., Can.

C. S. Mott, Flint, Mich., vice-president and director General Motors Corporation, has been made chief of the advisory staff, to succeed Alfred P. Sloan, Jr., who will be connected with the New York production work.

C. F. Herington, who has been for the past five years with the Bonnot Co., Canton, Ohio, as mechanical engineer and district sales manager in Chicago, has resigned to accept a position on May 1 as vice-president of the Holbeck Engineering Co., Cleveland.

Richard H. Collins, president and manager Cadillac Motor Car Co., Detroit, has resigned to become associated with William C. Durant, former president General Motors Corporation, in his new automotive enterprise, Durant Motors, Inc.

Obituary

CAPT. WILLARD LYMAN CANDEE, aged 70, organizer and president of the Okonite Co., Passaic, N. J., died suddenly of heart disease April 25 in New York. In 1877 Mr. Candee, together with the late C. A. Cheever, organized the first telephone company in New York, incorporating for $20,000. This venture failed and later they organized the Okonite Co., for the manufacture of insulated wire and cable. Mr. Candee retired from active business in 1915.

JOHN J. BELLOWS, superintendent, Improved Seamless Wire Co., Providence, R. I., died in that city April 20, following an illness of about two months, in his seventy-fourth year.

METAL SCHEDULE CHANGES

New Rates of Duty Suggested on Behalf of Manufacturers and Others

WASHINGTON, April 26.—The following is a synopsis of requests of different interests in the iron and steel, non-ferrous metals and allied lines, in addition to those already published, for amendments to schedule C of the present traffic act. These requests were made verbally in some cases and in others were sent in writing to the Ways and Means Committee:

The American Mining Congress submitted the following suggestions relative to ores and metals:

Antimony—10c. per lb. upon antimony salts and sulphuret; 10c. per lb. upon antimony as regulus or metal or matte containing antimony, or in antimonial lead; 8c. per lb. antimony content on antimonial ores.

Bauxite—$3 per lb. bauxite; compensatory duties on manufactured aluminum metal and aluminum salts and bauxite abrasives and refractories.

Chromite—Ore, 60c. per unit Cr_2O_3; refractories, 65c. per unit Cr_2O_3; ferrochrome, 11½c. per lb. Cr content; salts, 90c. per unit Cr.

Fluorspar—$6 per ton on grade of 80 per cent CaF_2 or better.

Graphite—Ore under 50 per cent graphite content, 1c. per lb.; ore over 50 per cent graphite, 2c. per lb.; lump and chip, 3c. per lb.; manufactured graphite products, graphite content, 5c. per lb. and 20 per cent ad valorem.

Lead—2c. per lb. on lead in ores, copper matte, etc.; 2¼c. per lb. on dross, bullion, pigs, bars, etc.; 2½c. per lb. on sheets, pipe, shot, glazier's wire, etc.; 3c. per lb. on white lead pigments.

Manganese—Ores, 40c. per unit of manganese content; ferromanganese, $1 per unit of manganese content.

Magnesite—Ore, ½c. per lb.; calcined, ¾c. per lb.; brick, ¾c. per lb.

Molybdenum—50c. per lb. of MoS_2 in ores and concentrates; $1 per lb. of Mo contained in ferromolybdenum, calcium molybdate, and all other alloys and compounds of molybdenum, including molybdenum stick.

Tungsten—On ores, $9 per unit WO_3 contained therein; on tungsten contained in ferrotungsten, tungsten metal, tungsten powder and tungsten compounds, 30c. per lb. of tungsten contained therein; on high speed tungsten tool steel and all alloy steels containing tungsten, 65 per cent ad valorem.

Zinc—Ores less than 10 per cent zinc, free; over 10 per cent and less than 25 per cent, 1½c. per lb. on zinc content; ores and drosses containing more than 25 per cent metallic zinc, 2c. per lb. on zinc content; blocks, pigs, or slabs, old and worn out zinc, fit only to be remanufactured, 2¾c. per lb.; zinc oxide, pigment, containing zinc, not containing lead, dry 2¾c. per lb.; sheets, plates, or otherwise fabricated zinc dust, 3¾c. per lb.

John A. Roebling's Sons Co., Trenton, N. J., submitted a statement concerning steel wire, asking for a change in paragraph 114 of schedule C in order to make a distinction between high carbon and low carbon wires. The suggested paragraph carries a rate of 25 per cent for the high carbon wire, instead of 15 per cent and substitutes inches and fractions of inches for gages.

The Athenia Steel Co., Athenia, N. J., cold rolled steel, recommended 50 per cent ad valorem on cold rolled material; on tempered and polished, 60 per cent ad valorem.

Various ball bearing, roller bearing and steel ball manufacturers recommended in substance: Change present law by putting anti-friction bearings and parts thereof in separate paragraph and increase duty to 10c per lb. and 55 per cent ad valorem; ad valorem duty on metal parts of ball bearings and roller bearings, finished or unfinished, based on value to be determined by ascertaining cost of producing imported articles in United States; duty to be not less than 25 per cent of cost of production, with profit of not less than 10 per cent of cost of production, after deducting selling expenses, etc.

Railway Steel Spring Co., New York, steel tires, advocated a specific duty of 2½c per lb.

CANADIAN CONDITIONS

General Approval of Readjustment of Prices of Finished Materials

TORONTO, April 25.—The Canadian trade has had an opportunity to see what the new schedule of the United States Steel Corporation is going to mean here. Most of the dealers are pleased, and the same can be said of many dealers who have fairly heavy stocks on hand. They are pleased that the cuts went as far as they did, and on the other hand they are glad they went no farther, for if they had they would have cut too much ground out from under some of the yards and factories.

The case of bars will show how the Canadian market is affected. For some months there has been a ragged market here because warehouses have been busy getting rid of their stocks. It has been a matter, as one of the dealers explained, of seeing how much business they could do on as little loss as possible. The market has been any place from 3.50c. up to 4.25c., depending on the tonnage and the anxiety of the dealer to get out from under. Of course there is no money in it for the warehouses, and the buyers have been taking full advantage of their eagerness to unload. Under the new price of bars at 2.10c.—which, in turn, sets the market for the Canadian makers as well—they can be laid down in Toronto at present rates of freight, duty and exchange at 3.16c. An effort will now be made to establish a market at 4c., warehouse, which is not far removed from the price at which sales have been made. When shipments come under the new schedule, there will be some money in it for the dealers in place of simple liquidation regardless of cost and profit.

Pig Iron in Small Lots

Canadian furnaces are now selling pig iron at $34.10 for No. 1 foundry. This price was brought about when $25 became the recognized standard in the States. Sales are small, dealers now looking on car lots as very good business. The trouble is that many of the Canadian yards are stocked with coal that cost them around $14 per ton, and ore was put in when prices and charges were very high. One furnace in Hamilton is already piling iron in its yard, and is prepared to do this to the extent of 20,000 tons.

The Machine Tool Trade

Some rather promising inquiries are in the market at the present time, but the fact that there is no pressing need to put equipment in operation allows buyers to keep putting off final placing of orders. Railroad business has been disappointing, especially to the steel mills, where the much-needed tonnage of rails has failed to materialize.

Construction work has been begun on the plant of the Indianapolis Steel Products Co., near New Palestine, Ind. The company will manufacture bar products. The officers of the company live in Terre Haute, Ind., and are: President, Walter Bledsoe; vice president, W. N. Cox; secretary-treasurer, W. M. Lewis, who will also be the manager. He is superintendent of the Hoosier Rolling Mills, Terre Haute.

The Pitt Coal & Coke Co. has been organized by Lewis Rosser, Frank H. Stewartson, and A. J. Lewis, and offices have been opened in rooms 701-702-703 House Building, Pittsburgh. The new company will do a general brokerage and agency business in all grades of coal and coke.

The April meeting of the Cincinnati Chapter of the American Society for Steel Treating, will be held Friday evening, April 29, at the R. K. LeBlond Machine Tool Co.'s plant. An illustrated lecture on "Pyrometers and their Application" will be given by Claude S. Gordon, consulting engineer, Chicago. A buffet luncheon will be served after the meeting.

IRON AND INDUSTRIAL STOCKS

Marked Improvement in Values Is Noted, Due to Developments Abroad

Marked improvement in values of those iron and industrial stocks quoted on metropolitan exchanges is noted. Prices for shares dealt in over the counter also are higher, but the recovery in such issues is comparatively slow. The rebound in the former therefore suggests a technical rather than a fundamental basis, although most of the national and international developments of late have been of a constructive nature. Although England's finances show little improvement, those of France are improving and a balance of trade in her favor the past month is proof her industries are going forward and not backward. With the German settlement on anything like a definite basis, it is believed European affairs will progress rapidly, consequently international bankers are inclined to take a more hopeful view of the future. The recent action of some stocks, at least, is believed to reflect this more cheerful sentiment.

Aside from the recovery in the automobile and allied industries and in the manufacture of woolens, business in this country shows slight improvement, generally speaking. Banks, however, are slowly releasing frozen credits and cash reserves show increases, as is demonstrated by easier money rates in the leading financial centers. Plans are complete for the flotation of a huge Burlington Railroad bond issue, contingent on the sanction of the Interstate Commerce Commission, which in itself bespeaks easier financial conditions. On the other hand, steel stocks have advanced without noticeable increase in the demand for products and copper shares are higher, with only a slight increase in the export and almost no improvement in the domestic demand. Railroad equipment shares also are higher for no apparent basic reason other than general financial conditions. In conservative quarters, however, it is conceded the improvement in stock market values is bound to have at least a sentimental influence on general business.

The range of prices on active iron and industrial stocks from Saturday of last week to Monday of this week was as follows:

Allis-Chalm. com.	37 - 38½	Int. Har. pf.	— -104¾
Allis-Chalm. pf.	77¾ - 78	Lackawanna Steel.	47⅝ - 50
Am. Can com.	28¾ - 29¾	Midvale Steel.	26¾ - 28¼
Am. Can pf.	— - 83	Nat.-Acme	22⅛ - 23⅝
Am. C. & F. com.	121⅛ -124¾	Nat. E. & S. com.	58⅞ - 61⅝
Am. C. & F. pf.	112 -112⅞	N. Y. Air Brake.	72 - 74½
Am. Loco. com.	84½ - 86¾	Nova Scotia Steel.	34¾ - 35¼
Am. Loco. pf.	105 -105½	Press. Steel com.	84⅞ - 86
Am. Radiator com.	— - 70	Ry. Stl. Spg. com.	85¼ - 86
Am. Steel F. com.	29¼ - 29¾	Ry. Stl. Spg. pf.	98 -102¼
Bald. Loco. com.	85¼ - 89⅝	Replogle Steel.	25 - 26
Bald. Loco. pf.	— -101½	Republic, com.	57¾ - 60¾
Beth. Steel com.	52 - 54	Republic pf.	— - 91
Beth. Stl., Cl. B.	54 - 56½	Sloss com.	38¾ - 39¼
Beth. St., 8% pf.	102½-104¾	Superior Steel.	— - 40
Chic. Pneu. Tool.	63½ - 63¾	Un. Alloy Steel.	30⅛ - 31
Colorado Fuel.	29⅞ - 30	U. S. Pipe com.	16 - 17½
Cruc. Steel com.	74 - 80⅞	U. S. Steel com.	80⅜ - 83⅝
General Electric.	136 -137⅞	U. S. Steel pf.	109¾-110¼
Gt. No. Ore Cert.	28⅝ - 29½	Vanadium Steel.	28¾ - 30¾
Gulf States Steel.	28 - 28¼	Va. I. C. & Coke.	84 - 86¾
Int. Har. com.	87½ - 89½	Westingh'se Elec.	47⅛ - 47½

Republic Iron & Steel's Deficit

The effect of price reductions on and the lessening demand for steel products is reflected in the report of the Republic Iron & Steel Co. for the quarter ending March 31, last. The company in that period showed a surplus after all charges and taxes equal to 42c. a share on the preferred stock, but after the payment of the preferred and common stock dividends there was a deficit of $782,889. For the corresponding period last year, the company earned $4.46 a share on its common stock after paying preferred dividends, and there was a surplus after all disbursements of $889,817.

The income account for the first quarter of this year and 1920 follows:

	1921	1920
Net earnings	*$470,242	$2,353,020
Other income	51,255	112,873
Total income	$521,497	$2,465,893
Depreciation and renewals	$177,797	$398,819
Exhaustion of mines	54,845	104,165
Bond interest	184,244	185,591
Balance	$104,611	$1,777,317
Preferred dividends	$437,500	$437,500
Common dividends	450,000	450,000
Deficit	$782,889	†$889,817

*After deductions of charges for maintenance and repairs amounting to $704,058, and provisions for Federal taxes and other charges.
†Surplus.

Unfilled orders on the books of the company as at the close of business on March 31, 1921, amounted to 121,498 tons, compared with 198,678 tons at the close of 1920.

Industrial Finances

Directors of the United Engineering & Foundry Co., Pittsburgh, have recommended an increase in the capital stock from $7,500,000 to $17,500,000 by increasing the common capital from $5,000,000 to $15,000,000. The purpose is to provide treasury common stock with which to pay a 100 per cent stock dividend on the common authorization. The company now has $4,617,700 of common stock outstanding. Of its preferred authorization $1,930,400 has been issued. The company manufactures iron and steel works machinery, forging presses, engines, steel castings, steel, sand and chilled rolls. It operates plants at Pittsburgh, Youngstown, Ohio, Vandergrift, Pa., and Canton, Ohio.

President James A. Campbell states that the Youngstown Sheet & Tube Co., Youngstown, Ohio, earned its first quarter dividends of $1.75 per share on the preferred stock and $1 per share on the 800,000 shares of non-par value common and made a small addition to surplus, after providing the usual charges for depreciation, mine exhaustion and the like. The earnings, however, were in the first part of the quarter, largely by virtue of carryover business from 1920, March operations having shown a loss.

The Johnson Motor Wheel Co., South Bend, Ind., has been sold by the receiver to the Johnson Motor Wheel Co. of Delaware for $223,000, enabling the receiver to pay creditors in full. The company was organized two years ago with $400,000 capital stock.

Reorganization of the United Steel Alloy Corporation, Canton, Ohio, has been completed and arrangements perfected for a merger with the Berger Mfg. Co., manufacturer of metal products, and the United Furnace Co., both of Canton. The new company will have a capital of $9,525,000 and 905,000 shares of common stock. Harry R. Jones has been elected president of the new organization. E. A. Langenbach, chairman of the board; George H. Charls, vice-president and general manager; E. L. Hang, vice-president, and C. W. Krieg, secretary.

The Allis-Chalmers Mfg. Co., Milwaukee, Wis., showed sales in 1920 of $1,291,127 in excess of those of 1919, but operating profits of $1,219,400 less, owing to the increase in the cost of operation. Its surplus, however, was only $172,333 less than in 1919, due to the fact that $1,368,000 less was reserved for federal taxes and general contingent expenses. Net profits, after charges and federal taxes, were $3,564,248, as compared with $3,599,713 in 1919.

Schedules upon the involuntary petition in bankruptcy filed against the John Obenberger Forge Co., Milwaukee, show the liabilities to be $858,972 and the assets $1,778,329. Of the liabilities, $490,457 is unsecured. The principal unsecured creditors are the First Wisconsin National Bank of Milwaukee, with a claim of $182,867, and the Carborundum Co., Niagara Falls, N. Y., with a claim of $105,098.

The W. L. Romaine Machinery Co., 214 Sycamore Street, Milwaukee, voluntary bankrupt, has filed schedules admitting liabilities of $46,550 and claiming assets of $33,843. The assets have been ordered sold at public auction on April 29 at 10 a. m.

Two petitions in involuntary bankruptcy have been filed against the Warren Steel Castings Co., which has a plant at 3400 Maury Avenue, St. Louis, and normally employs 500 men. M. W. Broad, secretary of the company, is quoted as declaring the company solvent and charged that the suits were "spite work."

In accordance with an order from the local Federal Court, Detroit, the properties of the Maxwell Motor Co. will be sold at an early date. In accordance with the court ruling, the minimum acceptable bid will be $10,925,000. The company is perfecting plans for a general reorganization.

The Spencer Metal Products Co., Medina, Ohio, has been placed in the hands of G. T. Childs as receiver, following bankruptcy proceedings brought in the Federal Court in Cleveland. The operation of the plant may be resumed under the receiver.

The Union Twist Drill Co., Athol, Mass., has filed with the Massachusetts Commissioner of Corporations a statement of its financial condition as of Dec. 31 last, which shows total assets and liabilities of $10,212,270, contrasted with $6,629,689 at the close of 1919. The surplus account stood at $4,691,302, or $2,437,213 larger than on Dec. 31, 1919, indicating net earnings last year of that amount.

R. S. Collins and W. S. Lantz, receivers for the Texas Steel Co., Beaumont, Tex., have applied to the District Court for permission to offer the company's plant and business for sale at a public auction. The company is capitalized at $2,500,000.

Machinery Markets and News of the Works

TRADE CONTINUES DULL

Little, if Any, Improvement Noted in Sales of Machine Tools

Tool Building Plants of the Country Said to Be Operating at Less Than 10 Per Cent

There is yet no sign of any change in the machine-tool situation, in which extreme dullness is the outstanding characteristic.

Buying has fallen to such a low point that the machine-tool plants of the country are operating it is reported, at less than 10 per cent of capacity on the average.

In some markets, a fair volume of inquiries has been received, but most buyers go no further than the receiving of quotations. A decided turn for the better in the general business situation is needed to bring about a revival of general demand for machine tools.

A few fair-sized sales have been made, but the aggregate of sales during April has not been as large with some sellers as those of March.

The A. O. Smith Corporation, Milwaukee, has purchased five large presses for automobile work, costing about $100,000. A manufacturer of automobiles has purchased four internal grinding machines. A New England company entering the washing machine field has bought four turret lathes and other equipment.

Pratt & Whitney have announced reductions on some of their products.

New York

NEW YORK, April 26.

Local machine-tool trade last week was as dull as the preceding weeks. Few inquiries are being received. Orders are also few, single machines predominating. With some sellers April business has not been as good as that of March.

The Link-Belt Co., Chicago and Philadelphia, has announced a reduction of prices on its lines of elevating and conveying machinery, malleable iron and steel chains, malleable iron buckets and sprocket wheels. New prices are contained in its general price list No. 334. The company states that its overhead expenses have been reduced, the efficiency and output of its men have been increased, raw materials have been marked down to present market levels, and all of these decreased costs, together with a considerable portion of profits, have been applied to price reductions in an effort to stimulate buying.

While there is still a fairly large number of crane inquiries in the market, the past week was particularly dull. The largest crane purchase reported was that of the International Nickel Co., 43 Exchange Place, New York, which bought a 30-ton, two 10-ton and one 5-ton, all 80-ft. span, and three 5-ton, 60-ft. and 40-ft. span overhead traveling cranes for Pittsburgh from the Shaw Electric Crane Co., through Manning, Maxwell & Moore, New York. Hyde, McFarlan & Burke, 90 West Street, New York, recently in the market for a locomotive crane, has purchased a 20-ton used Industrial locomotive crane from the Hog Island Shipyards.

Bids on the electric cranes for the city of Philadelphia, opened April 5 and 19, resulted in Maris Brothers submitting the lowest bid in both cases, with Alfred Box & Co. second on the 5-ton crane and the Erie Steel & Construction Co. second on the two 10-ton cranes. Bids on the 20-ton crane will be opened May 3. Among recent inquiries is one from the Porcupine Boiler Co., Bridgeport, Conn.

The Watt Products Corporation, 217 Duffield Street, Brooklyn, manufacturer of special machinery for cork-working service, has leased the four-story factory at 603-11 Dean Street, 100 x 100 ft., for the establishment of a new plant. An assembling department will be installed. The company will take possession on May 1.

The Giles Engineering Co., 350 Broadway, New York, is preparing plans for a new four-story factory, 50 x 135 ft., at Congress and Linden avenues, Flushing, L. I., to cost about $250,000.

The J. V. D. Carburetor Co., Utica, N. Y., has been incorporated with an active capital of $53,000 by J. W. Davis, J. S. Johnson and H. C. Daiker, Utica, to manufacture carburetors and ignition equipment. The company is represented by Lee, Dowling & Brennan, Utica.

The Utica Motor Car Co., Kent Street, Utica, N. Y., has taken bids for a two-story, reinforced-concrete service and repair works, 50 x 250 ft., to cost about $150,000 with equipment. L. Kinne, Mayro Building, is architect.

The Piston Valve Corporation, New York, has been incorporated with a capital of $1,300,000 by R. H. and C. H. Matthiessen and W. G. Brown, Woolworth Building, to manufacture automobile engines and parts.

The L. & W. Spring Co., New York, has been incorporated with a capital of $30,000 by C. Stern, D. Brown and H. Flatto, 261 Broadway, to manufacture wire springs and other metal goods.

The Bell Machine & Auto Specialty Co., Richmond, S. I., has been incorporated with a capital of $50,000 by J. Bell, W. Liptrott and M. H. Loughbridge, 110 West Forty-second Street, New York, to manufacture machinery and automobile equipment.

George F. Hardy, 309 Broadway, New York, engineer, has plans under way for the construction of a new pulp mill for Flambeau Paper Co., Park Falls, Wis. Guy Waldo is secretary.

Brevete Motors, Inc., Jamaica, L. I., has been incorporated with a capital of $2,250,000 by G. H. Dein, G. Baque and J. B. Merrill, Jamaica to manufacture automobile and other motors and parts.

The Apollo-Phone Player Co., New York, has been incorporated with a capital of $50,000 by A. Meltzer and S. Moses, 163 West 130th Street, to manufacture piano player devices and kindred specialties.

The Department of Plants and Structures, Municipal Building, New York, has preliminary plans under way for its proposed municipal electric light and power plant at the Ferry Terminal, St. George, S. I., estimated to cost $1,258,000. Grover A. Whalen is city commissioner in charge.

The Superior Elbow Co., Brooklyn, has been incorporated with a capital of $20,000 by I. Medlinger and I. Litchblau, Brooklyn, to manufacture steel and metal piping, elbows, etc. It is represented by Welanko & Strauss, 196 Market Street, Newark, N. J.

Robert Grant, Woolworth Building, New York, iron and steel merchant, has filed application for the dissolution of the Slatington Iron & Steel Co., same address, a Pennsylvania corporation, in which he has been a principal stockholder. The properties of the company at Slatington, Pa., were recently acquired by Mr. Grant, and plans for additions and improvements are under way.

F. Averill, Poughkeepsie, N. Y., is having plans prepared for a three-story automobile repair works and service building, 100 x 110 ft., on Market Street, to cost about $100,000. Edward C. Smith, 39 Market Street Poughkeepsie, is architect.

The New York Air Brake Co., 165 Broadway, New York, is perfecting plans for the manufacture of motor trucks, and it is proposed to develop a large output of complete machines. It will be carried out in a department of the works at Watertown, N. Y.

The Metals & Commerce Corporation, New York, has been incorporated with an active capital of $5,100,000 by R. Bennett, Jr., W. J. Ryan and P. G. Brennan to manufacture metal products. Wing & Russell, 14 Wall Street, represent the company.

The Rotor Engine Corporation, New York, has been incorporated with a capital of $750,000 by C. L. Thompson, E. S. Hayne and L. B. Koch, 25 West Forty-third Street, to manufacture steam and gas engines.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has been granted permission by the Public Service Commission, to issue bonds for $1,000,000, the proceeds to be used in part for extensions and improvements in power plants, etc.

Electric traveling cranes, hoisting and conveying machinery and other freight-handling machinery will be installed on the new piers now being erected by the Dock Department, New York, at Staten Island, between Tompkinsville and Clifton, at a cost of about $20,000,000. The structures are expected to be ready for service in the fall, and the different companies which have signed leases are the Oriental Navigation Co., 39 Broadway, Pier No. 3; Pennsylvania Railroad, Pennsylvania Station, Pier No. 5; American Dock Co., 17 State Street, Pier No. 6; Wessel, Duval & Co., 25 Broad Street, Pier No. 8; Moore & McCormick, 5 Broadway, Pier No. 9; Edward M. Raphel & Co., 17 Battery Place, Pier No. 10; International Mercantile Marine Co., 9 Broadway, Pier No. 11; Pan-American Terminal & Dock Corporation, 233 Broadway, Piers Nos. 12 and 13; Nippon Yusen Kaisha, 120 Broadway, Pier No. 17, and the Pouch Terminal, Inc., 17 State Street, Pier No. 18.

The Mexican Petroleum Co., Ltd., 120 Broadway, New York, has arranged for a bond issue of $10,000,000, the proceeds to be used for extensions in refineries, improvements, general operations, etc. It is a subsidiary of the Pan-American Petroleum & Transport Co., same address. E. L. Doheny is president.

F. William Stocker, 501-7 Eighth Street, Hoboken, N. J., manufacturer of engineering specialties, will take bids early in June for his proposed new plant, two stories, 75 x 100 ft., at Jefferson and Eighth streets, estimated to cost about $50,000. Leo Feinen, 3697 Boulevard, Jersey City, N. J., is architect.

The Standard Oil Co., 26 Broadway, New York, has acquired property on East Twenty-second Street, Bayonne, N. J., in the vicinity of its oil refinery, for a consideration said to be in excess of $270,000. The buildings on the site will be demolished for proposed extension to the Constable Hook oil refinery.

The Torsion Test Piston Ring Corporation, Cranford, N. J., has been incorporated with a capital of $100,000 by Robert B. Watson and Robert D. Elder, 410 Prospect Avenue, to manufacture piston rings and other mechanical products.

The Hanover Brick Mfg. Co., Morristown, N. J., has been incorporated with a capital of $100,000 to manufacture brick with plant at Whippany. The incorporators are Charles W. Ennis, Richard L. and Jesse L. McEwan, 63 Elm Street.

The Nixon Nitration Works, Nixon, N. J., will lease a portion of its local plant, consisting of six one- and two-story buildings, averaging 40 x 200 ft., for foundry and light manufacturing work.

The Fords Foundry Co., Perth Amboy, N. J., recently incorporated with a capital of $50,000, has acquired a site on the William Gross property, fronting on the Lehigh Valley Railroad, for its new plant. The initial building will be one-story, 70 x 162 ft., with L extension, 30 x 50 ft., and will be used for the manufacture of gray iron castings. It is expected to have the plant ready for operation early in June, giving employment to over 75 men. Owen Caulfield and Alexander Balint, Jr., 175 Smith Street, Perth Amboy, head the company.

The Cook Electric Co., Newark, N. J., has filed plans for a new one-story plant, 40 x 75 ft., at 360-64 Jelliff Avenue, to cost about $20,000.

William D. Zilsky, Newark, has been granted permission to establish a factory at 263-65 New York Avenue for the manufacture of aluminum and other metal specialties, utilizing an existing structure. Provision is made that operations shall be conducted for one year only, at the end of which time the works are to be removed.

The Peerless Meter Co., Newark, has been incorporated with a capital of $125,000 by Robert A. Cullerton, Dominick Malloy and John A. Fardy, 30 Liberty Street, to manufacture gas meters and parts.

The Newark Automobile Body Builders, 105 Broome Street, Newark, have filed notice of organization to manufacture automobile bodies. Harry Rud, 424 Eighteenth Avenue, heads the company.

H. A. Hoffman, Newark, has plans under way for a new one-story machine shop, 50 x 100 ft., at 191-93 Miller Street, to cost about $15,000. Strombach & Mertens, 1091 Clinton Avenue, Irvington, are architects.

The Essex Metal Bed Co., Newark, has been organized by William Weisglass and Abraham Henig, 9 Clinton Street, to manufacture metallic bedsteads.

The Alp Electric Mfg. Co., 325-27 East Ferry Street, Newark, has been incorporated with a capital of $100,000 by Mauritz Larsen, Eric H. Anderson and Walfred A. Peterson to manufacture electrical products.

The Ampere Novelty Mfg. Co., 197 North Sixteenth Street, East Orange, N. J., has been organized to manufacture metal specialties. W. P. Post, Jr., heads the company.

Philadelphia

PHILADELPHIA, April 25.

Alfred Box & Co., 813 North Front Street, Philadelphia, manufacturer of cranes, hoisting machinery, etc., are having plans prepared for a new one-story shop, 110 x 300 ft., at Tioga and Trenton streets, to cost about $100,000. Clarence E. Wunder, 1415 Locust Street, is architect.

The B. F. Goodrich Rubber Co., Akron, Ohio, has leased the factory of the Reyburn Mfg. Co., Twenty-third and Allegheny streets, Philadelphia, totaling 100,000 sq. ft. in floor area, for a branch plant. The Reyburn company, specializing in the manufacture of tags, etc., is completing the construction of a new plant at Thirty-second and Allegheny streets.

The Kensington Machine Works, Philadelphia, has been organized to manufacture machinery and parts. George Weinman, Jr., 4811 North Thirteenth Street, heads the company.

Howard F. Grow, 1306 North Third Street, Philadelphia, has filed plans for a new one-story machine shop at Melvale and Ontario streets, 96 x 138 ft.

The Philadelphia Wire & Ornamental Iron Works, 306 South Lawrence Street, Philadelphia, has taken title to property at Federal and Clarion streets for about $22,000. It is reported that the site will be used for a plant building, but no official announcement has been made.

The William Cramp & Sons Ship & Engine Building Co., Richmond and Norris streets, Philadelphia, has acquired property at Fletcher and Richmond streets, 124 x 375 ft., for $105,000, to be used in connection with its plant.

The De Laval Steam Turbine Co., North Clinton Street, Trenton, N. J., has awarded a contract to J. W. Ferguson, United Bank Building, Paterson, N. J., for a three-story machine shop, 160 x 220 ft., to cost about $150,000 with equipment.

The Mercer Welding Rods Co., Trenton, N. J., has been incorporated with a capital of $125,000 by Thomas Richmond, John J. Lawler and Harry Bernstein to manufacture iron rods and other steel and iron specialties. It is represented by Alexander Budson, 901 American Mechanic Bank Building.

The Jersey Shore Mine Car Co., Jersey Shore, Pa., has plans under way for a one-story addition to be equipped as a forge shop and assembling works. C. R. Herritt is general manager.

The Delaware, Lackawanna & Western Railroad Co., Scranton, Pa., coal mining department, has broken ground for the erection of a one-story forge and machine shop, 83 x 92 ft., at its Pettebone Colliery, near Wilkes-Barre, Pa., to cost $30,000.

The Dombach-Bissinger Motor Co., Lancaster, Pa., has been incorporated with a capital of $450,000 by Abraham S. Dombach, John B. Bissinger and George L. Butts, Lancaster, to manufacture automobiles.

The Pennsylvania Power & Light Co., Allentown, Pa., is planning for the erection of a one-story machine shop at its power plant at Hauto, Pa., and occupying a site adjoining that structure. Construction is under way on a new generating unit at this place estimated to cost about $3,000,000 with machinery. It is proposed to commence the installation of equipment during the summer and have the plant ready for service in the fall.

The Bethlehem Spark Plug Co., Bethlehem, Pa., has secured a contract from the Ford Motor Co., for furnishing all spark plugs to be used in the Fordson tractors, as well as for a number of Ford automobiles and trucks. The company will increase operations at its plant, employing a full day and night shift, with plans for increasing the working force at an early date.

The Concrete Pipe & Construction Co., Lemoyne, Pa., is contemplating the erection of a number of new plant units. It has just completed the initial unit for the manufacture of culvert pipe, sewer pipe, etc., and has a site of 7½ acres.

Cleveland

CLEVELAND, April 25.

No improvement is noted in the machinery market although some dealers report a slightly better volume of inquiry. Most of these, however, are for single machines and the largest for only three or four tools. A number of buyers want to trade in an old machine for one or more new ones and consequently many transactions are of that character. Some dealers report that their April sales will slightly exceed those of March, but with others the volume of business during April has shown no increase. Among inquiries is one from the Champion Engineering Co., Kenton, Ohio, for shapers, bending rolls and a measuring machine, but this business is not expected to be placed for some time.

A canvass of local foundries the past week showed an average operation of 24 per cent as compared with 20 per

cent a month ago. The slight improvement was confined to only one or two foundries.

The Sterling-Knight Motor Co., Cleveland, has been incorporated with $1,000,000 preferred capital stock and will equip a plant for the manufacture of automobiles. It will take over the work that has been carried on the past year by the Sterling-Syndicate which has been developing a new car. P. H. Withington is president and general manager; J. G. Sterling, vice-president and A. M. Snyder, secretary-treasurer.

The Mullins Body Corporation, Salem, Ohio, has taken an option on a plant in Detroit and may move to that city as a result of labor troubles in Salem which grew out of the company's placing its plant on a 9-hr. day.

The Hertner Electric Co., Cleveland, will erect a one-story factory, 60 x 250 ft.

The Anderson Crane Corporation, 1300 Leader-News Building, Cleveland, recently incorporated with a capital stock of $2,500,000, will place on the market a crane for loading and unloading packages from box cars to boats. M. Andrews is president; D. S. Andrews, vice-president, and J. R. Wyllie, secretary-treasurer.

The Sherer Machine Co., Cuyahoga Falls, Ohio, has been incorporated with a capital stock of $25,000, succeeding the Sherer Machine & Garage Co., and will manufacture battery parts and do machine contract and repair work. Charles Gray is president and J. H. Sherer treasurer and general manager.

The Atlas Brass Mfg. Co., which will move its plant from Cleveland to Bellefontaine, Ohio, has placed contract for the erection of two brick and concrete factory buildings, 50 x 300 ft., and 50 x 100 ft., respectively.

Chicago

CHICAGO, April 25.

Aggregate sales of machine tools remain at a low level, but here and there a few good-sized individual orders have been taken, some coming from the automotive industry. The A. O. Smith Corporation, Milwaukee, manufacturer of pressed steel frames, parts and forgings for automobiles and motor trucks, has purchased five large presses which, with side-drive machinery, will cost $100,000. A manufacturer of passenger automobiles has bought four internal grinding machines, involving a total of $8,000. For its Milwaukee plant, the Nash Motors Co. bought a 1-in. turret lathe. Other fair sized orders have come from miscellaneous sources. The National Brake & Electric Co., Milwaukee, has purchased a large face grinding machine and a milling machine, amounting to about $12,000, and Bliss & Laughlin, Inc., Harvey, Ill., bought a shaft and wire rod straightening machine costing $9,000. The Baraboo Mfg. Co., Baraboo, Wis., manufacturer of ice machines, has closed for a 1½-in. universal turret lathe. Small shops, many of them engaged in automobile repair work, are prominent purchasers of equipment. One local dealer booked an order for $2,900 worth of miscellaneous machine shop equipment for a small shop in Chicago. Another local machinery house has made three sales of this sort, totaling $1,800, $1,300 and $900, respectively.

The Briskin Mfg. Co., sheet metal works, 215 South Hoyne Avenue, Chicago, has had plans prepared by Dubin & Eisenberg, 139 North Clark Street, for a two-story addition, 50 x 77 ft., to cost $25,000.

The Peerless Tool Co., manufacturer of a new type of lifting jack, has leased the second floor, 100 x 100 ft., of the building at 340 West Huron Street, Chicago, for manufacturing purposes.

The Alemite Die Casting & Mfg. Co. has moved into its new plant at 2640-54 Belmont Avenue, containing 42,000 sq. ft. of floor space. It makes die castings for musical instruments, talking machines, typewriters, carburetors, etc.

The Creamery Package Mfg. Co., 61 West Kinzie Street, Chicago, will open bids about May 1 for the construction of a four-story factory, 200 x 400 ft., Curtis Avenue and Division Street.

The Board of Education, Harrisburg, Ill., is having plans drawn for a two-story school, 140 x 140 ft., to include a manual training department, at a cost of $300,000. G. Davenport, president.

Fire recently damaged the plant of the Standard Malleable Iron Co., Muskegon Heights, Mich., with a loss of $25,000.

The Spencer Welding Works, Spencer, Iowa, will open a branch welding plant in Spirit Lake, Iowa.

Fire recently damaged the plant and warehouse of the Advance Automobile Accessories Corporation, 4346 Wentworth Avenue, Chicago, the loss being estimated at $75,000 for the plant machinery and stock and $20,000 for the building.

The Illinois Central Railroad expects to award contract soon for alterations to its shops at Waterloo, Iowa, at a cost of $40,000.

The American Sanitary Mfg. Co., Abingdon, Ill., has increased its capital stock from $120,000 to $240,000. Additional buildings and equipment are planned.

The Liberty Mfg. Co., manufacturer of a patent automobile tire chain, will erect a plant at Duluth, Minn. It was organized in Minneapolis, but Charles P. Smith, president and general manager, is now in Duluth to select a site and make further arrangements. Plans call for a main building, two-stories, 100 x 250 ft., and a one-story structure, 65 x 80 ft., for drop forging.

W. E. Brown, 1103 North Topeka Street, Wichita, Kan., has awarded contract for a two-story garage, 100 x 140 ft., to cost $170,000.

The Automatic Coupler & Trailer Equipment Co., 954 West Twenty-first Street, Chicago, has been incorporated with a capital of $100,000 by Norman T. Brenner, Meyer B. Mervis and Charles A. Holland, to manufacture railroad and other heavy mechanical equipment.

The Grindle Fuel Equipment Co., 11 South Rockwell Street, Chicago, has preliminary plans under way for a new plant. Frank D. Chase, Inc., 645 North Michigan Avenue, is architect and engineer.

The C. H. Milles Foundry Co., 2225 West Thirty-fifth Street, Chicago, has been incorporated with a capital of $50,000 by Charles H., William T., and C. J. Milles, to manufacture iron and steel castings.

The W. A. Schaffer Fountain Pen Co., Fort Madison, Iowa, will make extensions and improvements in its plant to cost about $35,000.

Fire, April 18, destroyed a portion of the plant of the Advance Automobile Accessories Corporation, 4346 Wentworth Avenue, Chicago, manufacturer of automobile equipment, with loss estimated at about $75,000.

The American Electrical Supply Co., 953 Washington Boulevard, Chicago, is completing plans and will soon take bids for a new three-story building, 110 x 120 ft., at 117-21 South Morgan Street, to cost about $100,000. C. T. Brown is president.

Radiated Bearings, Inc., 127 North Dearborn Street, Chicago, has been incorporated with a capital of $100,000 by A. A. and A. M. McClanahan, and James B. Watson, to manufacture bearings and other specialties.

Detroit

DETROIT, April 25.

Production has been started in the new factory of the Ewing Bolt & Screw Co., River Rouge, Mich. Orders on the books are sufficient to keep the plant busy for 60 days and it is stated that the outlook is good for a continuance of normal production.

It is reported that the plant of the Saginaw Shipbuilding Co., Saginaw, Mich., has been sold to Frank W. Ruggles, former president Republic Truck Co., Alma, Mich., and will be converted into a factory for the manufacture of motor trucks. Mr. Ruggles has organized a Canadian company at London, Ont., for the manufacture of commercial vehicles.

The Viking Motor Co., Detroit, has been organized to manufacture airplanes driven by a special 16-cylinder engine, the invention of R. L. Bailly, treasurer of the company. His associates are John W. Schwartz, formerly of Golden, Belknap & Schwartz, engine manufacturers, Detroit, who is president, and Fred W. Aldrich, vice-president and secretary. A site has been leased on Gratiot Avenue, Detroit, and in addition to the factory hangars will be erected.

The Monarch Pattern Works, Detroit, has bought a site, 40 x 100 ft., in Marysville, Mich., and a factory will be erected as soon as business becomes normal. H. J. Chandler is secretary-treasurer.

The Hull Machine Works, Lansing, Mich., has added a complete welding outfit to its present equipment and is enlarging its working force to care for increased business.

The Buick Motor Car Co. is removing its assembling plant from St. Louis to Flint, Mich. Lack of business at St. Louis is given as the reason.

The Public Lighting Commission, Detroit, will have plans and specifications prepared for a new power house to cost $50,000.

The General Spring & Wire Co., 1930 Marston Avenue, Detroit, will take new bids early in May for its one-story plant, 200 x 250 ft., at Fort Avenue and Oakwood Boulevard, to cost about $175,000 with equipment. A one-story power house will also be constructed. Edward D. Shank, 28 South Dearborn Street, Chicago, is architect. C. L. Clark is secretary.

The Attwood Brass Works, 742 Front Avenue, N.W., Grand Rapids, Mich., has been incorporated with a capital of $100,000 to manufacture brass, bronze and other metal products. Charles F. Attwood is president.

The Jeffrey-De Witt Co., 3145 Lenschner Avenue, Hamtramck, Mich., manufacturer of porcelain spark plug equipment and other products, is having plans prepared for a new five-story and basement factory at Butler Avenue and the Grand Trunk Railroad, estimated to cost about $200,000, including machinery.

The Sperlich & Uhlig Co., Detroit, has been incorporated with a capital of $300,000 by J. Herman Uhlig, Edward F. Wunch and Herman A. Sperlich, 44 Colorado Avenue, to manufacture electrical appliances and equipment.

The Common Council, Union City, Mich., is taking bids for a new hydroelectric generating plant, estimated to cost about $150,000. Holland, Akerman & Holland, 166 East Liberty Avenue, Ann Arbor, Mich., are architects.

The Cheney Talking Machine Co., 24 North Wabash Avenue, Chicago, a subsidiary of Marshall Field & Co., has leased the plant of the Berkey & Gay Furniture Co., Grand Rapids, Mich., for the establishment of new works.

The Bierwirth Pattern Works, 51 West Hancock Street, Detroit, has plans under way for a new one-story factory at Marysville, Mich., 40 x 100 ft. Clyde Bierwirth is president.

The Ravenna-Conklin Electric Light & Power Co., Ravenna, Mich., recently incorporated with a capital of $120,000, has plans under way for the erection of a new hydroelectric generating plant to cost about $85,000. Bids will soon be asked. Thomas F. Rogers and Frank E. Thatcher head the company.

The Hercules Steel Post Corporation will erect a factory at Niles, Mich. Plans have been drawn and construction is scheduled to begin within 30 days. The company has patents on a steel post which can be driven into the ground and remain firm.

Buffalo

BUFFALO, April 25.

The Earl R. Maltby Co., Ellicott Square, Buffalo, manufacturer of roofing products, has awarded a contract to Morris & Allen, Prudential Building, for its new one-story plant, 100 x 130 ft., on Payne Avenue, North Tonawanda, N. Y.

Cleburne Eberhart, Jr., Chelsea Place, near Ferry Street, Buffalo, manufacturer of metal goods, is planning for the erection of a one- and two-story addition, 100 x 100 ft., for the manufacture of automobile and aeroplane engine parts and similar specialties.

George W. Goethals & Co., 40 Wall Street, New York, engineers, have taken over the management of the Beaver Board Co., Buffalo, and its 23 subsidiaries in different parts of the country and Canada. Operations will be conducted as heretofore. The managing agreement is for a period of one year. General C. C. Jamieson, a member of the Goethals organization, has been made vice-president and general manager of the Beaver Board Co.

The Neupert Mfg. Co., Buffalo, has been incorporated with a capital of $100,000 by C. W. and J. Neupert to manufacture machinery. The company is represented by Paul Sheehan, Erie County Bank Building.

The Thatcher Glass Mfg. Co., West Second Street, Dunkirk, N. Y., is planning to rebuild its factory, destroyed by fire, April 19, with loss estimated at about $150,000, including machinery.

The De Grasse Paper Co., Pyrites, N. Y., has taken bids for the erection of its proposed new four-story mill addition, 36 x 50 ft., estimated to cost about $35,000.

Fire, April 19, destroyed the plant of the Warner Jewelry Case Co., 682 Michigan Avenue, Buffalo, with loss estimated in excess of $100,000, including machinery.

Pittsburgh

PITTSBURGH, April 25.

A more optimistic tone prevails in the machinery trade than recently has been noted, but the change in sentiment appears to be based on a better inquiry rather than on any appreciable increase of business. Such orders as are being placed generally are small and usually represent necessary replacement. Several steel companies in this district have been quietly buying shears, lathes and other machine shop equipment to take the place of worn out tools. The Pittsburgh Board of Public Education recently awarded the tools required for the manual training departments of the Ralston school and the Westinghouse and Allegheny high schools.

The Fairbanks Co. was awarded the six 9-in. screw cutting engine lathes for the Ralston school and the four 9-in. screw cutting engine lathes for the Allegheny high school, at $283.50, each, the lathes being the product of the Seneca Falls Mfg. Co., Seneca Falls, N. Y. The Somers, Fitler & Todd Co., Pittsburgh, was awarded a 9-in. Seneca Falls taper attachment for the Ralston school at $67.50 and a draw-in chuck attachment for the same school at $55.35, to come from the Seneca Falls Mfg. Co. The Knox-Andresen Co., Pittsburgh, was awarded five 4-in. 3-jaw chucks, without face plates, two for the Allegheny school and three for the Ralston, at $19, each. The Niles-Bement-Pond Co. was the successful bidder for six 6-in. independent 4-jaw chucks, without face plates, for the Ralston school, at $20 each. Two 6-in. 4-jaw chucks, without face plates, for the Allegheny high school were awarded to the Somers, Fitler & Todd Co. at $20 each and the same firm secured a tool center grinder for the Ralston school at $76. Welbourne & Co. will furnish a 16-in. Whipp crank shaper at $650; the Backer Machine Tool Co. a 20-in. drill press at $166; the Somers, Fitler & Todd Co. two bandsaw filing, setting and jointing machines at $185 each and the Briggs Machinery Co. was awarded a Greenlee vertical hollow chisel mortiser at $640 for the Westinghouse high school. No action yet has been taken by the school boards of Johnstown and Butler, Pa., and Wheeling, W. Va., against their recent inquiries. It is understood that the National Wrought Iron Annealing Box Co., Washington, Pa., which has under way an addition to its plant, has covered against its machine tool requirements. The International Nickel Co. recently closed with Manning, Maxwell & Moore, Inc., for eight cranes for its new plant at Huntington, W. Va., and the controllers and motors for these cranes also will be furnished by the same company. It is expected that the hammers, hot mill, sheet mill and merchant mill will be awarded shortly. All of the bids for these installations have passed through the office of Frank I. Ellis, consulting engineer, Farmers Bank Building, Pittsburgh, and have gone to New York. The Wheeling Steel Corporation is understood to have placed the 7½-ton and 20-ton overhead cranes for the Wheeling plant of the Whitaker-Glessner Co., with an Alliance, Ohio, maker. Engineers have not yet completed their work on the proposed extensions at the Steubenville works of the LaBelle Iron Works, and the sending out of requests for revised bids waits upon the submission to the directors of the Wheeling Steel Corporation, the parent company, of the engineers' recommendations. An award of the 10-ton crane and two monorail hoists inquired for by the Pittsburgh Screw & Bolt Co. is yet to be made. W. R. Miller & Co., 607 Boggs Avenue, Pittsburgh, has taken bids against the mixing and mechanical equipment for the steel works of the State Iron & Steel Co., Queensland, Australia, a project which has been under consideration for several years but which now promises to move forward.

The Bovaird & Seyfang Mfg. Co., Bradford, Pa., manufacturer of oil well supplies, boilers, etc., has taken bids for two one-story additions, 150 x 187 ft., and 87 x 110 ft., to cost about $100,000 with equipment.

The Re-enforced Switch & Mfg. Co., Pittsburgh, has been incorporated with a capital of $50,000 to manufacture switches and other railroad equipment. Charles Dunbar, 3515 Campus Avenue, is treasurer.

The Northside Brick Co., Pittsburgh, is being organized by W. J. Wilson, John Schlarmann and Joseph C. Gartner, to manufacture brick, tile and kindred products. Application for a State charter will be made on May 9. W. F. Stadtlander, 802 Frick Building, represents the company.

The McKinley-Gregg Automobile Co., Pittsburgh, has been incorporated with a capital of $100,000 to manufacture automobile equipment, etc. C. G. McKinley, 496 Gettysburg Avenue, is treasurer.

The Autostart Mfg. Co., Charleston, W. Va., has been incorporated with a capital of $50,000 by C. H. Peterson, E. L. Rose and S. R. Kay, Charleston, to manufacture automobile starting equipment.

The North American Coal Co., Maidsville, near Morgantown, W. Va., is planning for the rebuilding of its power house and motor building, recently destroyed by fire.

The Charleston Bolt & Forging Co., Charleston, W. Va., recently organized with a capital of $200,000, has plans under way for new works in the vicinity of St. Albans to manufacture machine, truck and carriage bolts, and similar products. The plant is estimated to cost about $100,000, with machinery, and will include a complete galvanizing department for small forgings for automobile service. The initial plant will give employment to about 75. C. M. Dunnavant is president, and W. S. Stork, vice-president and general manager.

The United States Sheet & Window Glass Co., Morgantown, W. Va., recently incorporated with a capital of $4,000,000, is planning for the erection of a number of additions and the installation of considerable machinery.

The Central Automobile Corporation, Fairmont, W. Va., is planning for the erection of a new two-story service building and repair works, 60 x 120 ft.

The Ward-Pocahontas Coal Co., Welch, Va., recently in-

corporated with a capital of $200,000, is planning for the installation of an aerial tramway and other equipment at Laeger, W. Va. T. A. Lambert is president, and G. J. Cooper, consulting engineer.

The Buckhannon Light & Water Co., Buckhannon, W. Va., is contemplating the erection of a new electric power plant, 38 x 75 ft., to cost about $85,000 with machinery. L. Hudson, Wabash Building, Pittsburgh, is engineer.

J. F. McCreary & Son, Seventeenth Street, Beaver Falls, Pa., will take bids early in May for a two-story automobile service building and repair works at Seventh Avenue and Seventeenth Street, 50 x 95 ft., to cost about $50,000. J. H. Hughes, Townsend Club, New Brighton, Pa., is architect.

Boston

BOSTON, April 25.

A new price list issued by the Pratt & Whitney Co. shows a decline of 10 per cent on certain lines of equipment. Otherwise manufacturers' prices are unchanged. Little new construction is going forward, nor are established plants enlarging their equipment, consequently few companies are interested in machine tools at any price. The continued lack of inquiries involving more than single lots substantiates this statement, and the market appears to be drifting along with bookings smaller than they have been within the memory of the trade.

The market for used tools has begun to feel the effects of the business depression. One of the most active local houses sold 49 machines during March, compared with less than a dozen for the first half of April, and not a single tool the past week. The showing by other houses is similar. There are, however, many more inquiries for used than for new tools.

The outstanding feature this week again involves the sale of considerable equipment by a machine tool builder to a dealer, this time in Providence, R. I. Both new and used equipment is involved, including several new 12-in. lathes. The Lombard-White Co., Worcester, Mass., washing machines, has purchased four turret lathes and is in the market for gear hobbing machinery. The Page-Lewis Arms Co., Chicopee Falls, Mass., has made inquiries on a profiler and is considering the purchase of gun making equipment, but will not be in the market for at least two months. A Fitchburg, Mass., concern recently incorporated to manufacture motors has purchased a small amount of used equipment. Construction of the company's plant is not completed. A Worcester manufacturer of nuts has closed on a used No. 2 Brown & Sharpe surface grinder. The National Collapsible Tube Co., Providence, is in the market for die casting machinery.

Some houses profess to see an improvement in the demand for machine shop supplies and small tools, while others claim it is no better than it has been. Carbon drills are still offered in this market by outside interests as low as 80 per cent discount, which is considerably lower than quotations by local dealers. Keener competition has resulted in lower prices on some kinds of files. The demand for screw machine parts is fairly good. Many manufacturers are taking advantage of the dull period to overhaul their equipment.

E. C. Southwick, foreign trade secretary of the Chamber of Commerce, Providence, R. I., has announced that Louis Wille, Geneva, Switzerland, will be in Providence in the next few days to purchase American watch making machinery.

The Lombard-White Co., Harlow Street, Worcester, Mass., which occupies a part of the plant of the Rockwood Sprinkler Co., is preparing to manufacture in quantity a special washing machine and is inquiring for bronze castings. Later it plans to place on the market a small washing machine, of the same design, for use in bathrooms.

The Corona Machine Corporation, Malden, capitalized for $25,000, has been granted a Massachusetts charter to manufacture crushing, grinding and mixing machinery. Matthew L. Insogna and Peter C. De Luca, Dorchester; C. Lowell Hanson, Melrose, and Justin A. Duncan, Winthrop, are interested in the company.

The A. F. Way Co., Inc., Hartford, Conn., special and textile machinery, recently increased its capitalization $11,000 for further development. The total amount of stock outstanding is now $35,000. J. T. Way is president; W. C. Loring vice-president, and A. F. Way secretary and treasurer.

The Plainville Casting Co., Plainville, Conn., recently incorporated with a capital of $50,000, has purchased a site having a frontage of 150 ft. on the New York, New Haven & Hartford Railroad, and will erect a foundry.

The roundhouse and machine shops of the Maine Central Railroad at Calais, Me., were destroyed by fire last week. Reconstruction will start as soon as possible.

The Axilla Safety Razor Co., Norwalk, Conn., has been incorporated with a capital of $50,000 by Mederic and Odilon Fleury, South Norwalk, to manufacture razors and other cutlery.

The O'Hara Waltham Dial Co., Rumford Avenue, Waltham, Mass., has awarded a contract to L. J. Geoffrion, 12 Howard Street for its one-story addition, 50 x 64 ft., estimated to cost about $15,000. Eliot O'Hara is head.

The Windham Mfg. Co., 263 Summer Street, Boston, will make extensions and improvements in its plant on East First Street, South Boston, including the installation of new electric motors, shafting, belting and special machinery.

The Hygienic Coin Lock Co., Boston, has filed notice of organization to manufacture locks and locking devices. Philip Holmes and I. J. Segal, 6½ Devonshire Street, head the company.

The plant and property of the Trego Motor Co., Fox and Perry streets, New Haven, Conn., will be offered for sale on May 4. It consists of several buildings, with total area of about 50,000 sq. ft., and two acres of land.

The Drown Specialty Co., Worcester, Mass., recently organized to manufacture machinery for the paper industry, has leased space at 540 Main Street, for its proposed plant.

The Harig Motor Co., Lawrence, Mass., has taken bids for a two-story automobile service and repair works, 80 x 150 ft., on Hampshire Street, to cost about $125,000. Ashton & Huntress, Blakeley Building, are architects.

The Typodex Co., Cambridge, Mass., has been incorporated with a capital of $25,000 to manufacture printing press attachments and parts. George M. Faulkner is president; and G. H. Brown, 31 Wendell Street, Cambridge, treasurer.

The Martin Rocking Fifth Wheel Co., Longmeadow, Mass., is planning for the establishment of a new automobile truck assembling plant. It will be affiliated with a transportation concern, recently organized with a capital of $1,000,000, and the proposed works will be used for the equipment of the parent organization.

Baltimore

BALTIMORE, April 25.

The Paragon Motor Car Co., Connellsville, Pa., and First National Bank Building, Cumberland, Md., has taken title to property near the Cumberland Narrows, as a site for its proposed new automobile plant, comprising about 200 acres of land. Instead of a main two-story building, as previously announced, a one-story building, 274 x 450 ft., will be constructed as the initial unit, with experimental building, 60 x 60 ft., and two-story office, 100 x 150 ft. It is proposed to break ground at an early date. Philip W. Blake, Cumberland, is president.

The Lyon Mfg. Co., Inc., 2 East Lombard Street, Baltimore, has been incorporated with a capital of $100,000 by Robert H. and Walter R. Lyon, and William Cunningham, to manufacture automobile equipment and parts.

The Kennedy Corporation, Charles and Wells streets, Baltimore, manufacturer of iron and steel castings, mechanical equipment, etc., has acquired the plant of Fairbanks, Morse & Co., in the vicinity of its works, for extensions. About $60,000 was given for the property.

The Electro Heater Co., Silver Springs, Md., has been organized to manufacture heating and lighting equipment. It is headed by Harry E. P. Baden, Silver Springs; and Jay L. Benedict, Washington.

The Simmons Co., Kenosha, Wis., manufacturer of brass and iron beds, springs, etc., has filed plans for the construction of a two-story building, 120 x 182 ft., on Porter Street, Baltimore, estimated to cost about $70,000. A large portion of the works will be equipped for assembling. Clayton O. Nichols is engineer.

The Whitmore Machinery Syndicate, Norfolk, Va., has been incorporated with a capital of $150,000 to manufacture special machinery. J. W. Whitmore, Dendron, Va., is president, and W. L. Deveney, Jr., Norfolk, secretary.

The Tiretite Rubber Co., Wilmington, Del., has been incorporated with a capital of $100,000 by N. N. Tyson and Harry McKeon, Wilmington, to manufacture automobile tires. The company is represented by John P. Cann, Ford Block.

Fire, April 18, destroyed the service building and repair works of the Landis Motor Co., Henderson, N. C., with loss estimated in excess of $50,000.

The Halifax Power Co., Halifax, Va., has perfected plans for a new hydroelectric power plant on the Bannister River to cost about $350,000 with machinery. William C. Whitney & Co., Richmond, Va., are engineers.

The Dungannon Motor Co., Dungannon, Va., will build a new one-story service and repair building, 50 x 90 ft. Machinery to cost about $5,000 will be installed. O. E. Bevins is manager.

The Bureau of Yards and Docks, Washington, has plans

under way for the erection of a new plating shop at the naval station at Alexandria, Va.

The Covington Cotton Oil Co., Covington, Ga., will take bids at once for two one-story buildings, 60 x 80 ft., and 45 x 75 ft., to replace the plant recently destroyed by fire. The machinery installation is estimated to cost about $75,000.

The Falls Mfg. Co., Granite Falls, N. C., will build a new hydroelectric power plant on the Upper Little River, near Hickory, N. C., for textile mill operation.

The Champion Tire Patch Co., Lincolnton, N. C., recently organized with a capital of $50,000, will install buffers, labeling machines, etc., in an existing building for its proposed new plant. Kemp B. Nixon is president.

Samuel E. Browne, Brunswick, Ga., and associates are organizing a new company to establish a local plant for the manufacture of metal automobile rims and kindred products.

Cincinnati

CINCINNATI, April 25.

Orders for machine tools are about on a par with those for the month of March and buying is confined almost exclusively to single machines. Considerable activity, however, is noticed in used machinery and is coming from the smaller shops. Some dealers report fair activity among coal mining companies and tentative inquiries are coming from this source. An order for woodworking machinery was placed with a local manufacturer the past week for shipment to South America. There is very little activity in the crane market. A recent award was a 10-ton traveling crane by the Industrial Castings Co., Hamilton, Ohio, to the Niles Tool Works Co.

The Rosen Pump Mfg. Co., Belleview, Ky., has been incorporated with a capitalization of $10,000 to manufacture vacuum pumps. Victor Rosenhagen is president and general manager. It expects shortly to announce a location for a plant.

Construction of the plant of the Dixie Belle Refining Co., Louisville, Ky., will commence within the next 30 days, the contract having been awarded to the Roberts Construction Co., Boston. The refinery will have a daily capacity of 1500 bbl. a day and will cost about $500,000. H. G. Murphy, Louisville, is president and general manager.

Fire at the plant of the Harbison-Walker Refractories Co., Portsmouth, Ohio, April 19, caused damage estimated at $250,000.

The Cincinnati Traction Co., Cincinnati, has let contract for the erection of a generating plant in the Price Hill section and work will commence at once.

The Keuthen Foundry Co., Middletown, Ohio, has been incorporated with a capitalization of $100,000 by C. F. and L. Keuthen, J. W. and R. L. Ash and B. K. Koons.

The Fenton Foundry Supply Co., Dayton, Ohio, has been incorporated with a capitalization of $15,000 by William and John B. Fention, Wilbur Brower and Howard A. Wirts.

The Donaldson Lithographing Co., Newport, Ky., has purchased property adjoining its plant for the erection of an addition. It will be of brick and steel, four stories, 85 x 202 ft., and is expected to cost about $250,000.

The Central South

ST. LOUIS, April 25.

The Sieloff Packing Co., St. Louis, 4339 Natural Bridge Road, is in the market for refrigerating apparatus.

Fire, April 14, destroyed a portion of the refinery of the Husted Syndicate Oil Co., Sixteenth Street and Cookson Avenue, Kansas City, Mo., with loss estimated at about $25,000.

The Louisville & Nashville Railroad, Louisville, is perfecting plans for its new shops at Hazzard, Ky., comprising machine shop, engine house and other structures for locomotive repair work, estimated to cost about $435,000. W. H. Courtenay is chief engineer.

The Olive Hill Refractories Co., Ashland, Ky., recently organized, is planning for the erection of a new factory with initial daily output of about 30,000 fire brick and other refractory shapes. John F. Hagar is president and J. William Stewart, treasurer.

William E. Willis and W. J. Smiley, Richards, Mo., are organizing a company to build a new oil refinery in the vicinity of Springfield, Mo., with initial daily capacity of 500 bbl. With machinery it is estimated to cost about $100,000.

The E. E. Gooch Mfg. Co., Martin, Tenn., recently organized to manufacture compounds, is planning for the installation of considerable machinery in an existing building, consisting of grinding, mixing and packing machinery, electric motors, transmission machinery and other equipment. E. E. Gooch is president and manager.

The Chelsea Tile & Brick Co., Chelsea, Okla., has been incorporated with a capital of $50,000 by E. J. Dickerson, Vinita, Okla.; F. F. Dickerson and M. W. Hinch, Miami, Okla., to manufacture bricks, tiles and kindred products.

Fire, April 13, destroyed a portion of the local works of the Lee Tire & Rubber Co., 609-11 South Third Street, Louisville, with loss reported at about $75,000.

W. A. Patton, Catlettsburg, Ky., and associates are organizing a company to establish a plant for the manufacture of concrete blocks and kindred specialties.

The R. P. Rice Motor Co., Kansas City, Mo., has awarded a contract to A. J. Rector, Dwight Building, for the construction of a new one-story service building and repair plant, 60 x 122 ft., to cost about $150,000.

The Marland Oil Co., Tulsa, Okla., operating a refinery, has arranged for a bond issue of $4,000,000 to be used in part for extensions. E. W. Marland is president.

Indiana

INDIANAPOLIS, April 25.

The Henry Furnace & Foundry Co., 915 North Davidson Street, Indianapolis, is considering the erection of a new one- and two-story plant on Massachusetts Avenue to cost about $100,000. A large portion of the works will be given over to assembling operations.

The Studebaker Corporation, South Bend, Ind., is perfecting arrangements for full production at its plant in June. At present the works are turning out about 7500 automobiles per month, in May this will be increased to 8000 and in June a maximum of 8500 cars per month will be developed. The rated capacity of the plant is about 100,000 cars per annum. A. R. Erskine is president.

The City Council, Linton, Ind., will soon take bids for a new one-story electric light and power plant, 75 x 95 ft. A. J. Miller is mayor; Shrouds, Stoner & McCormick, 510 Tribune Building, Terre Haute, Ind., are engineers.

The Interstate Public Service Co., Board of Trade Building, Indianapolis, has awarded contract to the Bedford Steel & Construction Co., Bedford, Ind., for the erection of its new car shops at Scottsburg, Ind., estimated to cost about $200,000 with machinery.

The S. F. Bowser Co., Bowser Avenue, Fort Wayne, Ind., manufacturer of gasoline pumps and tanks, will defer the erection of its proposed one-story plant addition, 160 x 280 ft., estimated to cost about $200,000 with machinery. Contract for the building, which will be used primarily for tank production, has been let to Max Irmscher & Son, West Berry Street.

Milwaukee

MILWAUKEE, April 25.

Increasing interest in machine tools is shown by the automotive industries, which are making apparently more progress toward normal operations than most other industries having an influence on the machinery business. Actual sales remain of small volume, but inquiries show that some fair requirements are in the foreground.

The used tool business is moving forward slowly, offering considerable competition to new machines. The E. L. Essley Machinery Co.'s Milwaukee office is offering for sale a number of used tools which, for the present, are still in operation in the machine shop of the National Brake & Electric Co., Milwaukee. The list includes one 42-in. Bullard boring mill; one 52-in. Niles-Bement-Pond boring mill; two 16-spindle multiple drills; two 3-spindle sensitive drills; one 26-in. Barnes sliding head drill; one Williams & White hammer; three 14 x 6 Lodge & David lathes; three American-Fox lathes with turret; four 21-in. Gisholt lathes; one 3-in. Hulbert & Rogers cutting-off machine; two 22 x 10 Schumacher & Boye lathes; two No. 4 Brown & Sharpe millers; five Kempsmith plain and universal millers; one No. 2 Kearney & Trecker miller.

The Nash Motor Co., Kenosha, Wis., expects to begin work about May 15 on the construction of the second unit of its four-cylinder car division works at Milwaukee, at a cost of $1,000,000. Plans are now in preparation. While details are not complete, it is said that the principal building will be of brick and steel, three stories, 100 x 600 ft., equipped mainly for manufacturing bodies and all sheet metal parts and materials. A machine shop and assembling floor addition, 60 x 150 ft., is now being completed. Ben W. Twyman is general manager of the Milwaukee division.

The Tomahawk Steel & Iron Works, Tomahawk, Wis., sustained an estimated loss of $75,000 by fire on April 21 which practically destroyed the plant, consisting of a gray

iron foundry, machine shop, boiler shop and power plant. The pattern vault was saved. It is planned to rebuild at once. The company specialized in the manufacture and repair of sawmill, logging and general wood-working machinery and equipment.

The Farmers Barn Equipment Co., Stevens Point, Wis., has increased its capital stock from $60,000 to $125,000 and will devote most of the new issue to the purchase of additional equipment. No additions will be required at present, however. It occupies the plant of the former Western Wall Paper Co., transferring its operation from Two Rivers, Wis., to Stevens Point in April, 1920. E. W. Baerwald is secretary and general manager.

The Milwaukee Snow Conveying Co., Milwaukee, a new corporation with $25,000 capital stock, has leased the building at Twenty-third Avenue and Layton Boulevard and is installing equipment for the manufacture of patented machines for snow removal and disposition. The principal product is a rotary plow cutting a 10 ft. 6 in. swath at a speed of 1500 r.p.m., designed for use either with tractor, motor truck or street car. A. F. Krueger, 1348 Forest Home Avenue, the inventor and designer, is president and general manager.

The Fargo Co., Ripon, Wis., has been organized by Harry Fargo and associates and incorporated with an initial capitalization of $10,000 to manufacture ash receptacles, motor boat, automobile and motor truck accessories and other metal specialties. A. M. Herger and William A. Marigold are associated with Mr. Fargo. A plant has been equipped.

The Hinchley-Phillips Burr Co., Weyauwega, Wis., manufacturer of dental burrs and other metal products, has increased its capital stock from $15,000 to $50,000 to finance enlargement of production. It is buying some new machinery but for the present will not enlarge its plant.

The W. M. Mullins Mfg. Co., Hilbert, Wis., has been organized with a capital stock of $200,000 to manufacture steel and metal barn equipment, stable fixtures, etc. The incorporators are J. W. Grupl, W. G. Hass and F. A. Schmitt. A factory will be erected at once and machinery purchased.

The Falls Roller Mills Co., Sheboygan Falls, Wis., has broken ground for additions to its hydroelectric plant, dam, flour mill and grain elevator, and is now inquiring for some miscellaneous equipment. The architects are Juul, Smith & Reynolds, Sheboygan, Wis. Ernest Gonzenbach is president and general manager.

The Non-Breakable Battery Cell Co., Oconto Falls, Wis., has been incorporated with a capital stock of $30,000 by O. M. Saunders, P. H. Sharp and W. J. Munsert. It has leased quarters in an existing factory and is buying equipment.

Municipal Traffic Devices, Inc., Madison, Wis., has been organized with a capital stock of $100,000 to manufacture steel and iron fixtures and traffic posts. The incorporators are F. S. Winterbotham, Hal R. Martin and Theodore Walker, all of Madison. A small factory has been in operation for the past year and will now be enlarged.

The Board of Education, Sturgeon Bay, Wis., has awarded the general contract to Krasin Brothers, Marshfield, Wis., for the construction of a junior high and vocational training school costing about $100,000. Equipment for the shop departments will be purchased in about 30 days.

The French Battery & Carbon Co., Madison, Wis., has plans for enlargement of its capacity, for which the capital stock has been increased from $675,000 to $1,750,000. James B. Ramsey is president, and J. C. Ford, secretary and treasurer.

Canada

TORONTO, April 25.

The demand for machine tools shows a little more activity, and the past week several foundry and machine shop interests announced their intention of extending their plants and buying additional equipment. Small tools are still in poor call, but it is expected that these will also improve. Fred E. White, 163 Rothesay Avenue, St. John, N. B., is in the market for some machine shop equipment, and P. A. Wagner, Wellesley, Ont., is inquiring for a power drill press and hacksaw, several grinders and other machines, all second-hand. The John Inglis Co., Ltd., Toronto, expects to spend $75,000 on additions and machinery. A number of other companies have prepared lists, but are holding off buying until prices become more favorable.

C. Rehden & Son, Bowmanville, Ont., are having plans prepared for the erection of a foundry to cost $60,000.

The Canada Iron Foundries, Ltd., Fort William, Ont., are making arrangements for the erection of an addition to cost $150,000.

The St. Thomas Metal Signs, Ltd., St. Thomas, Ont., has been reorganized under a Dominion charter with $100,000 capital stock with W. F. Sutherland, president, and James T. Stewart, Springfield, Ohio, vice-president and general manager. Plans for further development include the erection of a new factory and the installation of additional equipment.

The Gove Motor Car Co., Detroit, Mich., is preparing to build a factory at St. Catharines, Ont.

The Middleton Cement Products Co., Middleton, N. S., will build an addition at an estimated cost of $50,000.

The Canadian Ironing Machine Co., Ltd., Woodstock, Ont., has been incorporated with a capital stock of $40,000 by Molyneaux L. Gordon, John F. Lucas, James W. Bicknell and others of Toronto as provisional directors. It is erecting a plant at Woodstock for the manufacture of laundry machines and appliances and expects to have it in operation in the near future.

The Gulf States

BIRMINGHAM, April 25.

The Ingalls Iron Works, Birmingham, has arranged for the immediate erection of a riveting shop, beam house and machine shop. New equipment will be installed. A new crane shed, 40 x 200 ft., with electric traveling crane, will also be constructed.

The Alabama Power Co., Birmingham, has been granted permission to issue bonds for $25,000,000. A large portion of the proceeds will be used for extensions and improvements, including the construction of a new hydroelectric generating plant at Duncan's Riffle. W. N. Walmsley is vice-president and general manager.

Fire, April 17, destroyed a portion of the plant of the James P. Sutton Steel & Structural Iron Foundry, Rousseau and St. Andrew streets, New Orleans, La., with loss reported at about $18,000. It will be rebuilt.

J. J. Kelly, Fort Lauderdale, Fla., is organizing a company for the establishment of a local plant for the manufacture of concrete blocks, tiles and kindred products.

The Farmers' Oil & Refining Co., Texarkana, Tex., is planning for the construction of an addition to its refinery to double the present capacity of 1000 bbl. Z. W. Drake is president and manager.

The Gulf Portland Cement Association, San Antonio, Tex., recently organized with a capital of $300,000, has plans under way for the erection of a plant in this section. It is headed by W. S. Campbell, San Antonio; L. C. Ihnken and John J. Shorp, Castroville, Tex.

The Graham Refining Co., Graham, Tex., recently organized with a capital of $250,000, is planning for the construction of a new electrically operated pumping plant with daily capacity of about 2500 bbl. J. G. Kilgore is president.

The Berger Mfg. Co., Canton, Ohio, has awarded contract for the construction of a new plant at Dallas, Tex., to cost $300,000. Metal building materials will be manufactured. George P. Galvin is district manager.

California

SAN FRANCISCO, April 20.

The machine tool market in this section continues quiet, due to general depressed conditions, the weakening tendency in prices and the presence of considerable quantities of used machinery. The gradual reduction of shipyard operations along the Coast has made possible this surplus of second-hand tools, which are being absorbed slowly. Brighter spots exist for automobile repair machines, especially lathes. Mining machinery, for which a fair demand is developing, has also shown an increase in the volume of business.

The Pacific Telephone & Telegraph Co., 333 Grant Avenue, San Francisco, has had plans prepared for a one-story machine shop and repair works on Inez Street, Fresno, for company automobiles. It will cost about $16,000.

The Wilmington Brass Foundry, Wilmington, Los Angeles, has filed notice of organization to manufacture brass and bronze products. F. J. Breen and R. J. Coan, Wilmington, head the company.

The California Hardware Co., East First Street, Los Angeles, has had plans prepared for a two-story addition, brick and steel, 120 x 150 ft. Morgan, Walls & Morgan, 1124 Van Nuys Building, are architects.

The Direct Steel Process Co., New Theatre Building, Santa Cruz, Cal., is negotiating for a site for the erection of a new plant. Plans will be prepared at an early date.

Warren S. Munger, Fresno, Cal., president Superior Oil Co., heads a new company which will build a plant for the manufacture of automobile tires. A site has been selected at Belmont, fronting on the line of the Southern Pacific Railroad, and plans are being completed for the initial unit, to be three-stories, of reinforced-concrete. The works will have a capacity of 500 cord tires and 1700 tubes per day, giving employment to about 400 operatives, and is expected to be ready for service early in the fall.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	3.23c.
Swedish bars, base price	12.50c.
Soft steel bars, base price	3.23c.
Hoops, base price	4.38c.
Bands, base price	3.93c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.23c. to 3.33c.
Channels, angles and tees under 3 in. x ¼ in., base	3.23c.

Merchant Steel

	Per Lb.
Tire, 1½ x½ in. and larger	3.23c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.43c.
Toe calk, ½ x ⅜ in. and larger	3.75c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.73c.
Squares, flats and hex	5.23c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c.
Extra best cast steel	25.00c.

Tank Plates—Steel

¼ in. and heavier	3.23c. to 3.33c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.23c. to 4.25c.
No. 12	4.28c. to 4.30c.
No. 14	4.33c. to 4.35c.
No. 16	4.44c. to 4.45c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.95c. to 5.18c.	.....
Nos. 22 and 24	5.00c. to 5.23c.	5.85c.
No. 26	5.05c. to 5.28c.	5.90c.
No. 28	5.15c. to 5.38c.	6.00c.
No. 30	5.40c. to 5.63c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	5.25c. to 5.38c.
No. 16	5.50c. to 5.63c.
Nos. 18 and 20	5.65c. to 5.78c.
Nos. 22 and 24	5.80c. to 5.93c.
No. 26	5.95c. to 6.08c.
No. 27	6.10c. to 6.23c.
No. 28	6.25c. to 6.38c.
No. 30	6.75c. to 6.88c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.
½ in. Butt	—46	—30
¾ in. Butt	—52	—37
1 to 3 in. Butt	—54	—40
3½-6 in. Lap	—49	—35
7-12 in. Lap	—40	—24

Wrought Iron	Blk.	Galv.
¾ in Butt	—18	List
1-1½ in. Butt	—20	— 2
2 in. Lap	—14	+ 3
2½-6 in Lap	—18	— 2
7-12 in. Lap	— 7	+10

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c.
Annealed soft	4.75c.
Galvanized annealed	5.50c.
Coppered basic	5.25c.
Tinned soft Bessemer	6.25c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18 c. to 21 c.
High brass wire	19¼c. to 21¾c.
Brass rod	17 c. to 20¾c.
Brass tube, brazed	32 c. to 35¾c.
Brass tube, seamless	21½c. to 23½c.
Copper tube, seamless	22½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$7.80	$7.55
		90 lb.	7.90	7.65
		100 lb.	8.00	7.75
IC..$12.00	$10.75	IC	8.15	7.90
IX.. 13.75	12.25	IX	9.15	8.90
IXX.. 15.25	13.75	IXX	10.15	9.90
IXXX.. 16.50	15.00	IXXX	11.15	10.90
IXXXX.. 18.00	16.25	IXXXX	12.15	11.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.35
IC	8.50
IX	9.50
Fire door stock	11.50

Tin

Straits pig	33½c.
Bar	36c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¾c. to 7c.
Sheet zinc, No. 9 base, casks	12c. open 13c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6 c. to 7 c.
Solder, ½ and ½ guaranteed	23c.
No. 1 solder	21½c.
Refined solder	17½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....30c. to 33c.

Old Metals

There was not much activity in the trade this week. The few transactions that went through were at concessions. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.00
Copper, light and bottoms	7.50
Brass, heavy	5.75
Brass, light	4.50
Heavy machine composition	9.50
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	7.50
Lead, heavy	3.50
Lead, tea	2.50
Zinc	2.75